

Report No.: SHEM201201071101

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TEST REPORT

Application No.:SHEM2012010711CRFCC ID:2AMIN-TW100ZMApplicant:Zimi Corporation

Address of Applicant: Room A913, No.159 Chengjiang Road, Jiangyin ,China

Manufacturer: Zimi Corporation

Address of Manufacturer: Room A913, No.159 Chengjiang Road, Jiangyin ,China Factory: 1.HUIZHOU LYAND ACOUSTIC TECHNOLOGY CO., LTD

2.Inventec Appliances(Jiangning) Corporation

Address of Factory: 1.NO.45, Xiangda Road, Xiaojinkou, Huizhou City, Guangdong Province,

P.R.China

2. No.133, Jiang Jun Road, Jiangning Economic and Technological Development

Zone, Nanjing City, P.R.China

Equipment Under Test (EUT):

EUT Name: ZMI PurPods Pro Wireless Noise Cancelling Earphone, ZMI PurPods True

Wireless Earbuds

Model No.: TW100ZM; TW101ZM¤

Please refer to section 2 of this report which indicates which model was

actually tested and which were electrically identical.

Standard(s): 47 CFR Part 15, Subpart C 15.247

Date of Receipt: 2020-12-29

Date of Test: 2020-12-30 to 2021-01-28

Date of Issue: 2021-01-29

Test Result: Pass*

Man Zhan

Parlam Zhan E&E Section Manager

The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report. If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards. Any mention of SGS International Electrical Approvals or testing done by SGS International Electrical Approvals in connection with, distribution or use of the product described in this report must be approved by SGS International Electrical Approvals in writing.



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^{*} In the configuration tested, the EUT complied with the standards specified above.



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Revision Record					
Version	Description	Date	Remark		
00	Original	2021-01-29	1		

Authorized for issue by:		
	hichard Mil	
	Micheal Niu / Project Engineer	
	Parlam Zhan	
	Parlam Zhan / Reviewer	



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2 Test Summary

Item	Standard	Method	Requirement	Result
Antenna Requirement	47 CFR Part 15, Subpart C 15.247	N/A	47 CFR Part 15, Subpart C 15.203 & 15.247(b)(4)	Pass
Other requirements Frequency Hopping Spread Spectrum System Hopping Sequence	47 CFR Part 15, Subpart C 15.247	N/A	47 CFR Part 15, Subpart C 15.247(a)(1),(g),(h)	Pass

Radio Spectrum Matter Part					
Item	Standard	Method	Requirement	Result	
Conducted Emissions at AC Power Line (150kHz-30MHz)	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 6.2	47 CFR Part 15, Subpart C 15.207	Pass	
Conducted Peak Output Power	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 7.8.5	47 CFR Part 15, Subpart C 15.247(b)(1)	Pass	
20dB Bandwidth	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 7.8.7	47 CFR Part 15, Subpart C 15.247(a)(1)	Pass	
Carrier Frequencies Separation	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 7.8.2	47 CFR Part 15, Subpart C 15.247a(1)	Pass	
Hopping Channel Number	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 7.8.3	47 CFR Part 15, Subpart C 15.247a(1)(iii)	Pass	
Dwell Time	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 7.8.4	47 CFR Part 15, Subpart C 15.247a(1)(iii)	Pass	
Conducted Band Edges Measurement	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 7.8.6	47 CFR Part 15, Subpart C 15.247(d)	Pass	
Conducted Spurious Emissions	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 7.8.8	47 CFR Part 15, Subpart C 15.247(d)	Pass	
Radiated Emissions which fall in the restricted bands	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 6.10.5	47 CFR Part 15, Subpart C 15.205 & 15.209	Pass	
Radiated Spurious Emissions	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 6.4,6.5,6.6	47 CFR Part 15, Subpart C 15.205 & 15.209	Pass	

Declaration of EUT Family Grouping:

Note:There are series models mentioned in this report, and they are the similar in electrical and electronic characters. Only the model TW100ZM was tested since their differences were the model number ,product name and appearance.



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4 General Information

4.1 Details of E.U.T.

Power supply: DC 3.7V by Rechargeable Lithium-ion Coin Cell

Test voltage: DC 3.7V

Antenna Gain: Left earbuds 0.75dBi(Provided by client)

Right earbuds 0.75dBi(Provided by client)

Antenna Type: Integral Antenna

Bluetooth Version: V5.2(Dual)
Channel Spacing: 1MHz

Modulation Type: GFSK, π/4DQPSK, 8DPSK

Number of Channels: 79

Operation Frequency: 2402MHz to 2480MHz

Spectrum Spread Technology:

Frequency Hopping Spread Spectrum(FHSS)

4.2 Description of Support Units

Description	Manufacturer	Model No.	Serial No.
Laptop	Lenovo	ThinkPad X100e	1



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4.3 Measurement Uncertainty

No.	Item	Measurement Uncertainty
1	Radio Frequency	8.4 x 10 ⁻⁸
2	Timeout	2s
3	Duty Cycle	0.37%
4	Occupied Bandwidth	3%
5	RF Conducted Power	0.6dB
6	RF Power Density	2.9dB
7	Conducted Spurious Emissions	0.75dB
8	RF Radiated Power	5.1dB (Below 1GHz)
0	RF Radiated Power	4.9dB (Above 1GHz)
		4.2dB (Below 30MHz)
9	Padiated Spurious Emission Test	4.5dB (30MHz-1GHz)
9	Radiated Spurious Emission Test	5.1dB (1GHz-18GHz)
		5.4dB (Above 18GHz)
10	Temperature Test	1°C
11	Humidity Test	3%
12	Supply Voltages	1.5%
13	Time	3%

Note: The measurement uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.



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4.4 Test Location

All tests were performed at:

Compliance Certification Services (Kunshan) Inc.

No.10 Weiye Rd, Innovation park, Eco&Tec, Development Zone, Kunshan City, Jiangsu, China.

Tel: +86 512 5735 5888 Fax: +86 512 5737 0818

No tests were sub-contracted.

4.5 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

• CNAS (No. CNAS L4354)

CNAS has accredited Compliance Certification Services (Kunshan) Inc. to ISO/IEC 17025:2017 General Requirements for the Competence of Testing and Calibration Laboratories (CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence in the field of testing.

A2LA (Certificate No. 2541.01)

Compliance Certification Services (Kunshan) Inc. is accredited by the American Association for Laboratory Accreditation (A2LA). Certificate No. 2541.01.

FCC (Designation Number: CN1172)

Compliance Certification Services Inc. has been recognized as an accredited testing laboratory. Designation Number: CN1172.

• ISED (CAB identifier: CN0072)

Compliance Certification Services (Kunshan) Inc. has been recognized by Innovation, Science and Economic Development Canada (ISED) as an accredited testing laboratory.

Company Number: 2324E

• VCCI (Member No.: 1938)

The 3m and 10m Semi-anechoic chamber and Shielded Room of Compliance Certification Services (Kunshan) Inc. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: R-1600, C-1707, T-1499, G-10216 respectively.

4.6 Deviation from Standards

None

4.7 Abnormalities from Standard Conditions

None



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5 Equipment List

RF Conducted Test

Item	Equipment	Manufacturer	Model	Serial Number	Cal Date	Cal. Due Date
1	Test Software	BST	TST PASS	V 1.1.0	N.C.R	N.C.R
2	Spectrum Analyzer	Agilent	E4446A	MY44020154	04/22/2020	04/21/2021
3	Spectrum Analyzer	Keysight	N9020A	MY53420174	09/25/2020	09/24/2021
4	Spectrum Analyzer	Keysight	N9020A	MY55370209	10/19/2020	10/18/2021
5	Signal Generator	Agilent	E8257C	MY43321570	10/10/2020	10/18/2021
6	MXG Vector Signal Generator	Agilent	N5182A	MY50142015	09/25/2020	09/24/2021
7	Universal Radio Communication Tester	R&S	CMU200	109525	10/19/2020	10/18/2021
8	Universal Radio Communication Tester	R&S	CMW500	159275	10/19/2020	10/18/2021
9	Power Meter	Anritsu	ML2495A	1445010	04/21/2020	04/20/2021
10	Switcher	CCSRF	FY562	KS301219	10/19/2020	10/18/2021
11	AC Power Source	EXTECH	6605	1570106	N.C.R	N.C.R
12	DC Power Supply	Aglient	E3632A	MY50340053	N.C.R	N.C.R
13	6dB Attenuator	Mini-Circuits	NAT-6-2W	15542-1	N.C.R	N.C.R
14	Power Divider	AISI	IOWOPE2068	PE2068	N.C.R	N.C.R
15	Filter	MICRO-TRONICS	BRM50701	5	N.C.R	N.C.R
16	Conducted test cable	1	RF01-RF04	/	04/21/2020	04/22/2021
17	Temp. / Humidity Chamber	TERCHY	MHK-120AK	X30109	04/21/2020	04/20/2021
16	Software	SGS	TST-PASS	N/A	N/A	N/A

RF Radiated Test

Item	Equipment	Manufacturer	Model	Serial Number	Cal Date	Cal. Due Date
1	Test Software	Farad	EZ-EMC	CCS-03A1	N/A	N/A
2	Spectrum Analyzer	R&S	FSV40	101493	01/08/2020	01/07/2021
3	Signal Generator	Agilent	E8257C	MY43321570	10/10/2020	10/18/2021
4	Loop Antenna	COM-POWER	AL-130R	10160008	04/29/2019	04/28/2021
5	Bilog Antenna	TESEQ	CBL 6112D	35403	06/22/2019	06/21/2021
6	Bilog Antenna	SCHWARZBECK	VULB9160	9160-3342	04/29/2019	04/28/2021
7	Horn-antenna(1-18GHz)	Schwarzbeck	BBHA9120D	267	10/26/2020	10/25/2022
8	Horn-antenna(1-18GHz)	ETS-LINDGREN	3117	00143290	02/25/2019	02/24/2021
9	Horn Antenna(18-40GHz)	Schwarzbeck	BBHA9170	BBHA9170171	02/27/2018	02/26/2021
10	Pre-Amplifier(30MHz~18GHz)	CCSRF	AMP1277	1	10/19/2020	10/18/2021
11	Pre-Amplifier(0.1~26.5GHz)	EMCI	EMC012645	980060	04/21/2020	04/20/2021
12	Low Pass Filter	MICRO-TRONICS	VLFX-950	RV142900829	N.C.R	N.C.R
13	High Pass Filter	Mini-Circuits	VHF-1200	15542	N.C.R	N.C.R
14	Filter (5450MHz~5770 MHz)	MICRO-TRONICS	BRC50704-01	2	N.C.R	N.C.R
15	Filter (5690 MHz~5930 MHz)	MICRO-TRONICS	BRC50705-01	4	N.C.R	N.C.R
16	Filter (5150 MHz~5350 MHz)	MICRO-TRONICS	BRC50703-01	2	N.C.R	N.C.R
17	Filter (885 MHz~915 MHz)	MICRO-TRONICS	BRM14698	1	N.C.R	N.C.R
18	Filter (815 MHz~860 MHz)	MICRO-TRONICS	BRM14697	1	N.C.R	N.C.R
19	Filter (1745 MHz~1910 MHz)	MICRO-TRONICS	BRM14700	1	N.C.R	N.C.R
20	Filter (1922 MHz~1977 MHz)	MICRO-TRONICS	BRM50715	1	N.C.R	N.C.R
21	Filter (2550 MHz)	MICRO-TRONICS	HPM13362	5	N.C.R	N.C.R
22	Filter (1532 MHz~1845 MHz)	MICRO-TRONICS	BRM50713	1	N.C.R	N.C.R
23	Filter (2.4GHz)	MICRO-TRONICS	BRM50701	5	N.C.R	N.C.R
24	RE test cable	1	RE01-RE04	/	04/21/2020	04/22/2021
25	Software	Fard technology co.,ltd	EZ-EMC	1.1.1.2	N/A	N/A



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6 Radio Spectrum Technical Requirement

6.1 Antenna Requirement

6.1.1 Test Requirement:

47 CFR Part 15, Subpart C 15.203 & 15.247(b)(4)

6.1.2 Conclusion

Standard Requirement:

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

15.247(b) (4) requirement:

The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

EUT Antenna:

The antenna is integral antenna and no consideration of replacement. The best case gain of the antenna is 0.75dBi.



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6.2 Other requirements Frequency Hopping Spread Spectrum System Hopping Sequence

6.2.1 Test Requirement:

47 CFR Part 15, Subpart C 15.247(a)(1),(g),(h)

6.2.2 Conclusion

Standard Requirement:

The system shall hop to channel frequencies that are selected at the system hopping rate from a Pseudorandom ordered list of hopping frequencies. Each frequency must be used equally on the average by each transmitter. The system receivers shall have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shall shift frequencies in synchronization with the transmitted signals.

Frequency hopping spread spectrum systems are not required to employ all available hopping channels during each transmission. However, the system, consisting of both the transmitter and the receiver, must be designed to comply with all of the regulations in this section should the transmitter be presented with a continuous data (or information) stream. In addition, a system employing short transmission bursts must comply with the definition of a frequency hopping system and must distribute its transmissions over the minimum number of hopping channels specified in this section.

The incorporation of intelligence within a frequency hopping spread spectrum system that permits the system to recognize other users within the spectrum band so that it individually and independently chooses and adapts its hopsets to avoid hopping on occupied channels is permitted. The coordination of frequency hopping systems in any other manner for the express purpose of avoiding the simultaneous occupancy of individual hopping frequencies by multiple transmitters is not permitted.

Compliance for section 15.247(a)(1): According to Technical Specification, the pseudorandom sequence may be generated in a nine-stage shift register whose 5th and 9th stage outputs are added in a modulo-two addition stage. And the result is fed back to the input of the first stage. The sequence begins with the first ONE of 9 consecutive ONEs; i.e. the shift register is initialized with nine ones.

- > Number of shift register stages: 9
- > Length of pseudo-random sequence: 29 -1 = 511 bits
- > Longest sequence of zeros: 8 (non-inverted signal)

Linear Feedback Shift Register for Generation of the PRBS sequence

An example of Pseudorandom Frequency Hopping Sequence as follow:

Each frequency used equally on the average by each transmitter.

According to Technical Specification, the receivers are designed to have input and IF bandwidths that match the hopping channel bandwidths of any transmitters and shift frequencies in synchronization with the transmitted signals.

Compliance for section 15.247(g): According to Technical Specification, the system transmits the packet with the pseudorandom hopping frequency with a continuous data and the short burst transmission from the Bluetooth system is also transmitted under the frequency hopping system with the pseudorandom hopping frequency system.

Compliance for section 15.247(h): According to Technical specification, the system incorporates with an adaptive system to detect other user within the spectrum band so that it individually and independently to avoid hopping on the occupied channels.

The system is designed not have the ability to coordinated with other FHSS System in an effort to avoid the simultaneous occupancy of individual hopping frequencies by multiple transmitter.



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7 Radio Spectrum Matter Test Results

7.1 Conducted Peak Output Power

Test Requirement 47 CFR Part 15, Subpart C 15.247(b)(1)
Test Method: ANSI C63.10 (2013) Section 7.8.5

Limit:

Frequency range(MHz)	Output power of the intentional radiator(watt)	
	1 for ≥50 hopping channels	
902-928	0.25 for 25≤ hopping channels <50	
	1 for digital modulation	
	1 for ≥75 non-overlapping hopping channels	
2400-2483.5	0.125 for all other frequency hopping systems	
	1 for digital modulation	
5725-5850	1 for frequency hopping systems and digital modulation	



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7.1.1 E.U.T. Operation

Operating Environment:

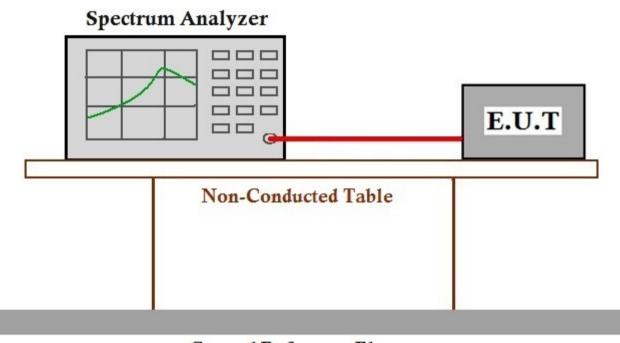
Temperature: 24 °C Humidity: 50 % RH Atmospheric Pressure: 1005 mbar

Test mode b:TX_non-Hop mode_Keep the EUT in continuously transmitting mode with GFSK

modulation, π/4DQPSK modulation, 8DPSK modulation. All modes have been

tested and only the data of worst case is recorded in the report.

7.1.2 Test Setup Diagram



Ground Reference Plane

7.1.3 Measurement Procedure and Data

The detailed test data see: Appendix for SHEM2012010711CR-BT-L Appendix for SHEM2012010711CR-BT-R



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7.2 20dB Bandwidth

Test Requirement 47 CFR Part 15, Subpart C 15.247(a)(1)
Test Method: ANSI C63.10 (2013) Section 7.8.7

7.2.1 E.U.T. Operation

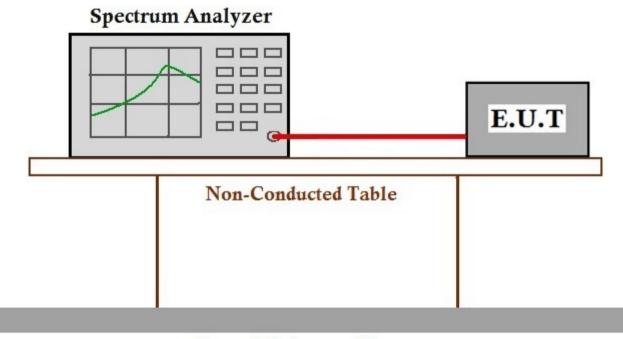
Operating Environment:

Temperature: 25 °C Humidity: 49 % RH Atmospheric Pressure: 1005 mbar Test mode b:TX non-Hop mode Keep the EUT in continuously transmitting mode with GFSK

modulation, π/4DQPSK modulation, 8DPSK modulation. All modes have been

tested and only the data of worst case is recorded in the report.

7.2.2 Test Setup Diagram



Ground Reference Plane

7.2.3 Measurement Procedure and Data

The detailed test data see: Appendix for SHEM2012010711CR-BT-L Appendix for SHEM2012010711CR-BT-R



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7.3 Carrier Frequencies Separation

Test Requirement 47 CFR Part 15, Subpart C 15.247a(1)
Test Method: ANSI C63.10 (2013) Section 7.8.2

Limit: 2/3 of the 20dB bandwidth base on the transmission power is less than

0.125W

7.3.1 E.U.T. Operation

Operating Environment:

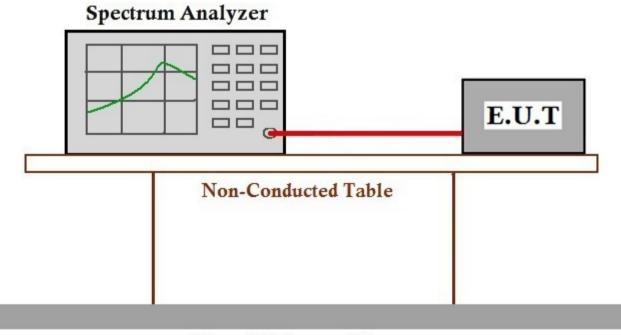
Temperature: 25 °C Humidity: 49 % RH Atmospheric Pressure: 1002 mbar

Test mode a:TX Hop mode Keep the EUT in frequency hopping mode with GFSK

modulation, π/4DQPSK modulation, 8DPSK modulation. All modes have been

tested and only the data of worst case is recorded in the report.

7.3.2 Test Setup Diagram



Ground Reference Plane

7.3.3 Measurement Procedure and Data

The detailed test data see: Appendix for SHEM2012010711CR-BT-L Appendix for SHEM2012010711CR-BT-R



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7.4 Hopping Channel Number

Test Requirement 47 CFR Part 15, Subpart C 15.247a(1)(iii)

Test Method: ANSI C63.10 (2013) Section 7.8.3

Limit:

Frequency range(MHz)	Number of hopping channels (minimum)
002.020	50 for 20dB bandwidth <250kHz
902-928	25 for 20dB bandwidth ≥250kHz
2400-2483.5	15
5725-5850	75

7.4.1 E.U.T. Operation

Operating Environment:

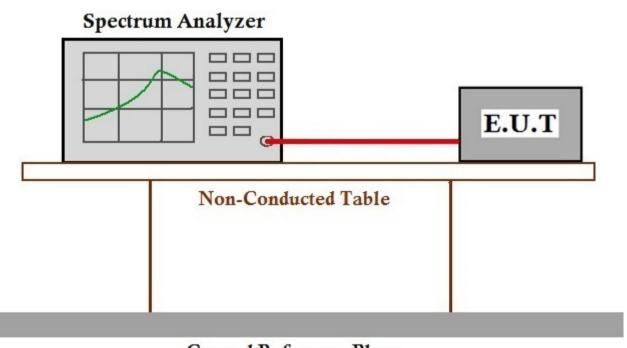
Temperature: 25 °C Humidity: 49 % RH Atmospheric Pressure: 1005 mbar

Test mode a:TX_Hop mode_Keep the EUT in frequency hopping mode with GFSK

modulation, π/4DQPSK modulation, 8DPSK modulation. All modes have been

tested and only the data of worst case is recorded in the report.

7.4.2 Test Setup Diagram



Ground Reference Plane

7.4.3 Measurement Procedure and Data

The detailed test data see: Appendix for SHEM2012010711CR-BT-L Appendix for SHEM2012010711CR-BT-R



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7.5 Dwell Time

Test Requirement 47 CFR Part 15, Subpart C 15.247a(1)(iii)

Test Method: ANSI C63.10 (2013) Section 7.8.4

Limit:

Frequency(MHz)	Limit
902-928	0.4S within a 20S period(20dB bandwidth<250kHz)
902-928	0.4S within a 10S period(20dB bandwidth≥250kHz)
2400 2402 5	0.4S within a period of 0.4S multiplied by the number
2400-2483.5	of hopping channels
5725-5850	0.4S within a 30S period

7.5.1 E.U.T. Operation

Operating Environment:

Temperature: 25 °C Humidity: 49 % RH Atmospheric Pressure: 1005 mbar

Test mode a:TX_Hop mode_Keep the EUT in frequency hopping mode with GFSK

modulation, $\pi/4DQPSK$ modulation, 8DPSK modulation. All modes have been

tested and only the data of worst case is recorded in the report.

7.5.2 Test Setup Diagram

Spectrum Analyzer E.U.T Non-Conducted Table

Ground Reference Plane

7.5.3 Measurement Procedure and Data

The detailed test data see: Appendix for SHEM2012010711CR-BT-L Appendix for SHEM2012010711CR-BT-R



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7.6 Conducted Band Edges Measurement

Test Requirement 47 CFR Part 15, Subpart C 15.247(d)
Test Method: ANSI C63.10 (2013) Section 7.8.6

Limit:

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)

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7.6.1 E.U.T. Operation

Operating Environment:

Temperature: 24 °C Humidity: 50 % RH Atmospheric Pressure: 1005 mbar

Pretest these a:TX_Hop mode_Keep the EUT in frequency hopping mode with GFSK

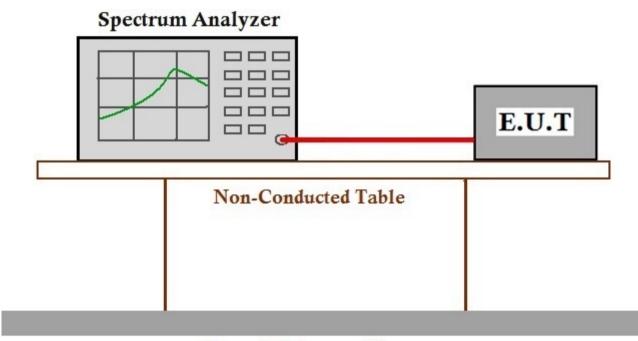
modes to find modulation, π/4DQPSK modulation, 8DPSK modulation. All modes have been

the worst case: tested and only the data of worst case is recorded in the report.

b:TX_non-Hop mode_Keep the EUT in continuously transmitting mode with GFSK modulation, $\pi/4DQPSK$ modulation, 8DPSK modulation. All modes have been

tested and only the data of worst case is recorded in the report.

7.6.2 Test Setup Diagram



Ground Reference Plane

7.6.3 Measurement Procedure and Data

The detailed test data see: Appendix for SHEM2012010711CR-BT-L Appendix for SHEM2012010711CR-BT-R



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7.7 Conducted Spurious Emissions

Test Requirement 47 CFR Part 15, Subpart C 15.247(d)
Test Method: ANSI C63.10 (2013) Section 7.8.8

Limit:

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in

§15.209(a) (see §15.205(c)



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7.7.1 E.U.T. Operation

Operating Environment:

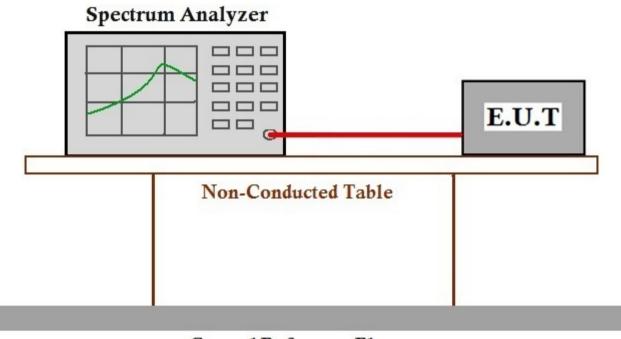
Temperature: 25 °C Humidity: 50 % RH Atmospheric Pressure: 1004 mbar

Test mode b:TX_non-Hop mode_Keep the EUT in continuously transmitting mode with GFSK

modulation, π/4DQPSK modulation, 8DPSK modulation. All modes have been

tested and only the data of worst case is recorded in the report.

7.7.2 Test Setup Diagram



Ground Reference Plane

7.7.3 Measurement Procedure and Data

The detailed test data see: Appendix for SHEM2012010711CR-BT-L Appendix for SHEM2012010711CR-BT-R



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7.8 Radiated Emissions which fall in the restricted bands

Test Requirement 47 CFR Part 15, Subpart C 15.205 & 15.209

Test Method: ANSI C63.10 (2013) Section 6.10.5

Limit:

Frequency(MHz)	Field strength(microvolts/meter)	Measurement distance(meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

Remark: The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90kHz, 110-490kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation.



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7.8.1 E.U.T. Operation

Operating Environment:

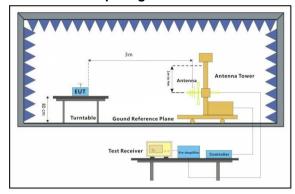
Temperature: 24 °C Humidity: 50 % RH Atmospheric Pressure: 1005 mbar

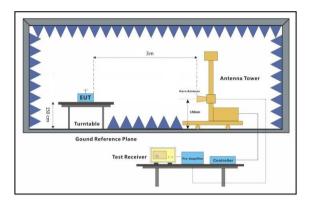
Test mode b:TX_non-Hop mode_Keep the EUT in continuously transmitting mode with GFSK

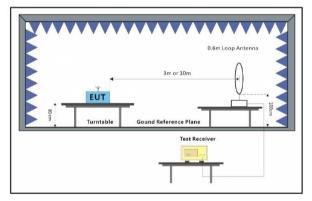
modulation, π/4DQPSK modulation, 8DPSK modulation. All modes have been

tested and only the data of worst case is recorded in the report.

7.8.2 Test Setup Diagram









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7.8.3 Measurement Procedure and Data

- a. For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter fully-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- c. The EUT was set 3 or 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- d. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- e. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- f. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- g. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.
- h. Test the EUT in the lowest channel, the middle channel, the Highest channel.
- i. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.
- j. Repeat above procedures until all frequencies measured was complete.

Remark 1: Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor

Remark 2: For frequencies above 1GHz, the field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. For the emissions whose peak level is lower than the average limit, only the peak measurement is shown in the report.



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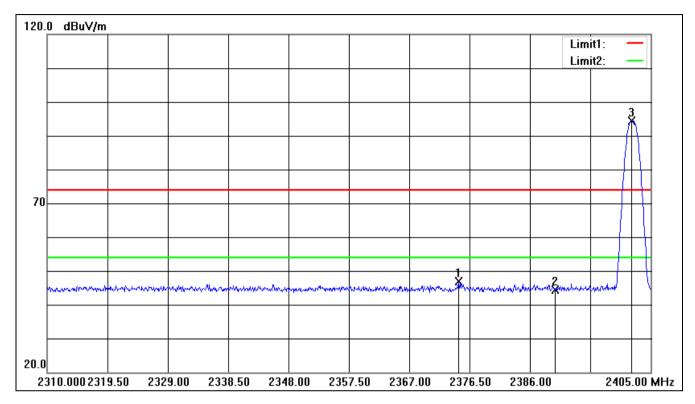


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Left Ear

Mode:b; Polarization:Horizontal; Modulation:GFSK; ; Channel:Low



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	2374.790	51.26	-4.28	46.98	74.00	-27.02	peak
2	2390.000	48.65	-4.24	44.41	74.00	-29.59	peak
3	2401.960	98.70	-4.21	94.49	74.00	20.49	peak



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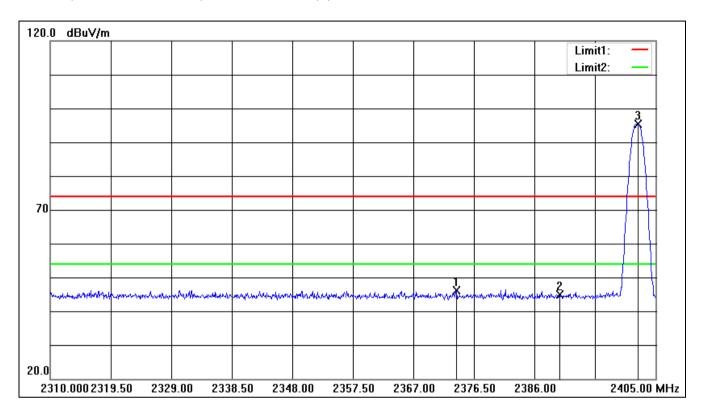
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Mode:b; Polarization:Vertical; Modulation:GFSK; ; Channel:Low



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	2373.745	50.38	-4.29	46.09	74.00	-27.91	peak
2	2390.000	49.02	-4.24	44.78	74.00	-29.22	peak
3	2402.245	99.55	-4.21	95.34	74.00	21.34	peak



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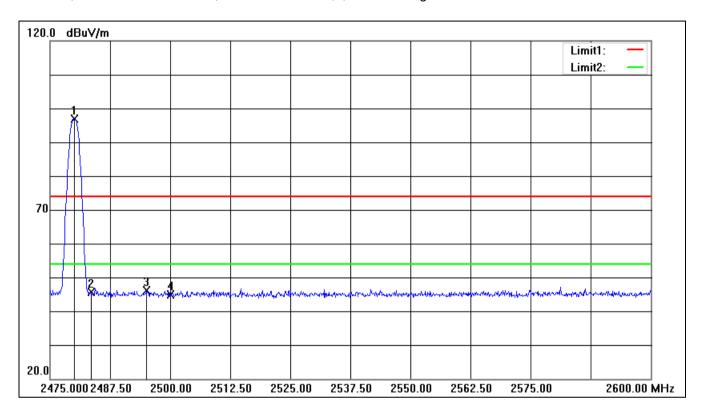
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Mode:b; Polarization:Horizontal; Modulation:GFSK; ; Channel:High



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	2480.000	100.95	-4.01	96.94	74.00	22.94	peak
2	2483.500	49.67	-4.00	45.67	74.00	-28.33	peak
3	2495.125	50.14	-3.97	46.17	74.00	-27.83	peak
4	2500.000	48.94	-3.96	44.98	74.00	-29.02	peak



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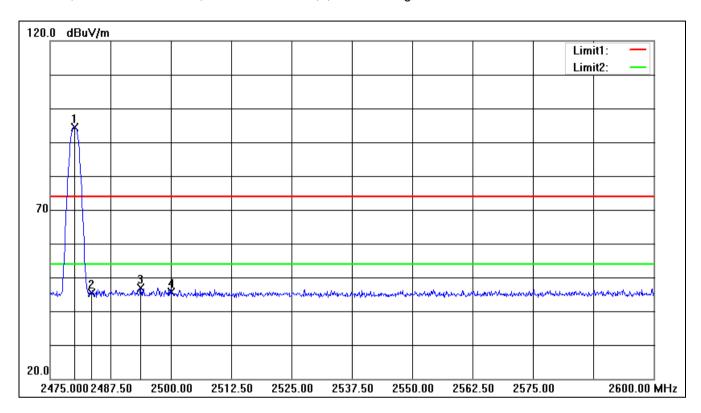
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Mode:b; Polarization:Vertical; Modulation:GFSK; ; Channel:High



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	2480.125	98.51	-4.01	94.50	74.00	20.50	peak
2	2483.500	49.37	-4.00	45.37	74.00	-28.63	peak
3	2493.750	50.90	-3.98	46.92	74.00	-27.08	peak
4	2500.000	49.56	-3.96	45.60	74.00	-28.40	peak



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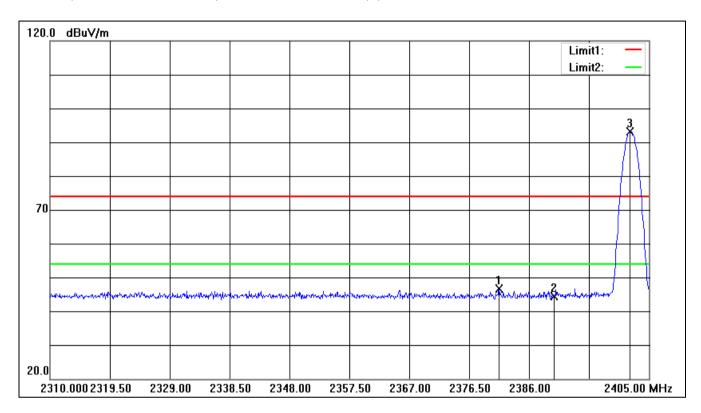
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Mode:b; Polarization:Horizontal; Modulation:π/4 DQPSK; ; Channel:Low



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	2381.250	50.90	-4.27	46.63	74.00	-27.37	peak
2	2390.000	48.66	-4.24	44.42	74.00	-29.58	peak
3	2401.960	97.38	-4.21	93.17	74.00	19.17	peak



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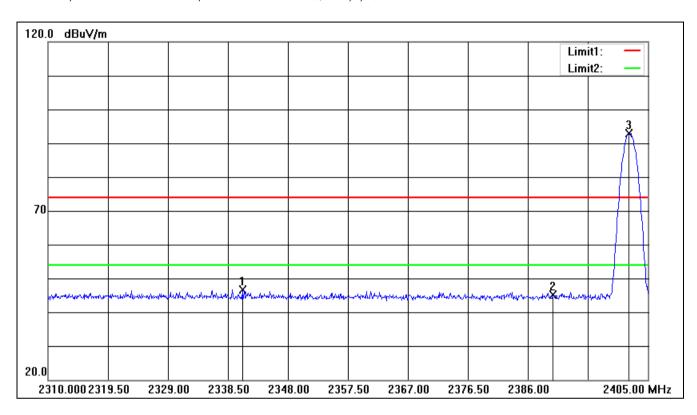
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Mode:b; Polarization:Vertical; Modulation:π/4 DQPSK; ; Channel:Low



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	2340.780	50.97	-4.37	46.60	74.00	-27.40	peak
2	2390.000	49.44	-4.24	45.20	74.00	-28.80	peak
3	2402.055	97.12	-4.21	92.91	74.00	18.91	peak



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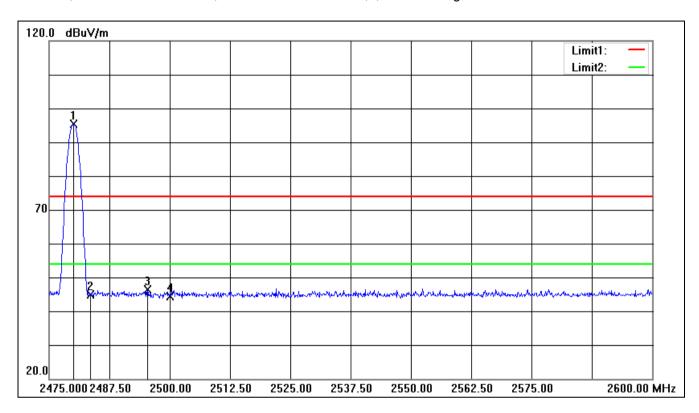
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Mode:b; Polarization:Horizontal; Modulation:π/4 DQPSK; ; Channel:High



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	2480.125	99.28	-4.01	95.27	74.00	21.27	peak
2	2483.500	49.00	-4.00	45.00	74.00	-29.00	peak
3	2495.375	50.26	-3.97	46.29	74.00	-27.71	peak
4	2500.000	48.46	-3.96	44.50	74.00	-29.50	peak



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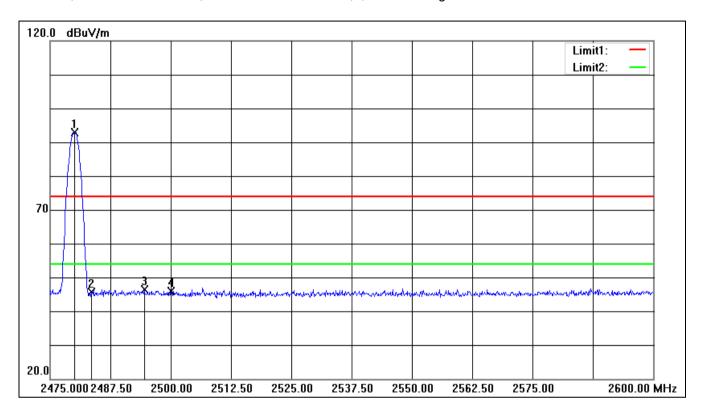
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Mode:b; Polarization:Vertical; Modulation:π/4 DQPSK; ; Channel:High



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	2480.125	96.98	-4.01	92.97	74.00	18.97	peak
2	2483.500	49.52	-4.00	45.52	74.00	-28.48	peak
3	2494.500	50.28	-3.97	46.31	74.00	-27.69	peak
4	2500.000	49.73	-3.96	45.77	74.00	-28.23	peak



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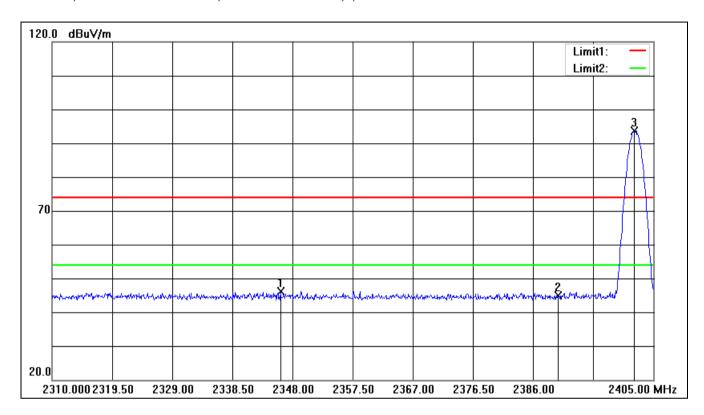
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Mode:b; Polarization:Horizontal; Modulation:8DPSK; ; Channel:Low



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	2346.100	50.59	-4.36	46.23	74.00	-27.77	peak
2	2390.000	49.05	-4.24	44.81	74.00	-29.19	peak
3	2402.055	97.90	-4.21	93.69	74.00	19.69	peak



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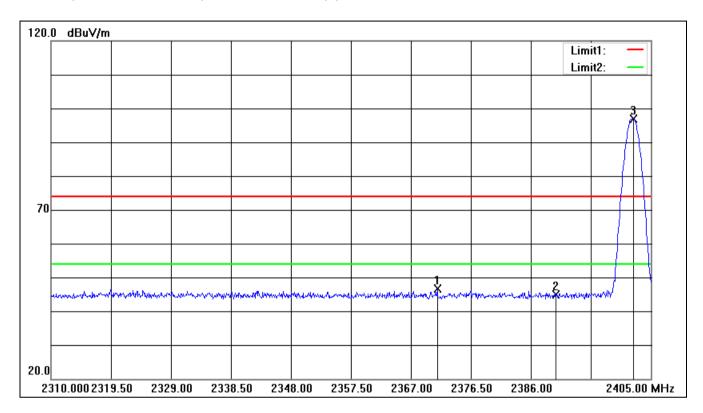
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Mode:b; Polarization:Vertical; Modulation:8DPSK; ; Channel:Low



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	2371.180	50.95	-4.29	46.66	74.00	-27.34	peak
2	2390.000	49.01	-4.24	44.77	74.00	-29.23	peak
3	2402.245	101.02	-4.21	96.81	74.00	22.81	peak



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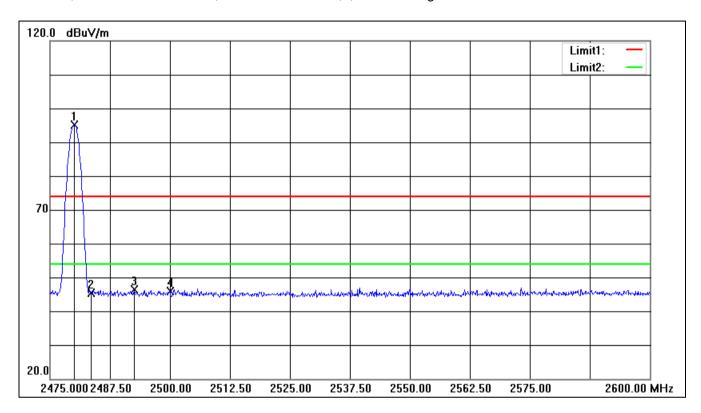
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Mode:b; Polarization:Horizontal; Modulation:8DPSK; ; Channel:High



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	2480.125	99.07	-4.01	95.06	74.00	21.06	peak
2	2483.500	49.48	-4.00	45.48	74.00	-28.52	peak
3	2492.500	50.25	-3.98	46.27	74.00	-27.73	peak
4	2500.000	49.76	-3.96	45.80	74.00	-28.20	peak



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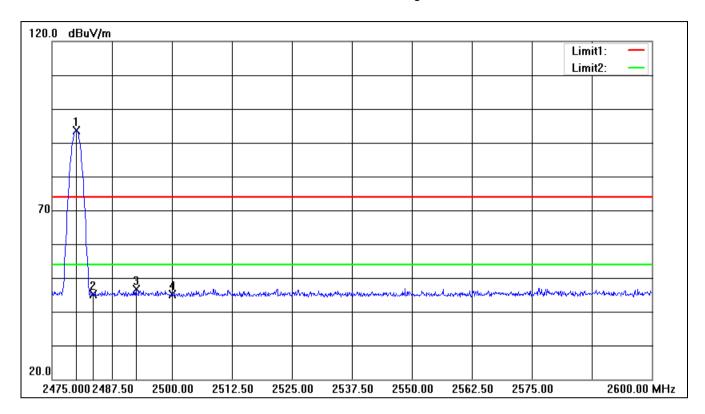
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Mode:b; Polarization:Vertical; Modulation:8DPSK; ; Channel:High



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	2480.125	97.55	-4.01	93.54	74.00	19.54	peak
2	2483.500	49.07	-4.00	45.07	74.00	-28.93	peak
3	2492.500	50.65	-3.98	46.67	74.00	-27.33	peak
4	2500.000	48.99	-3.96	45.03	74.00	-28.97	peak



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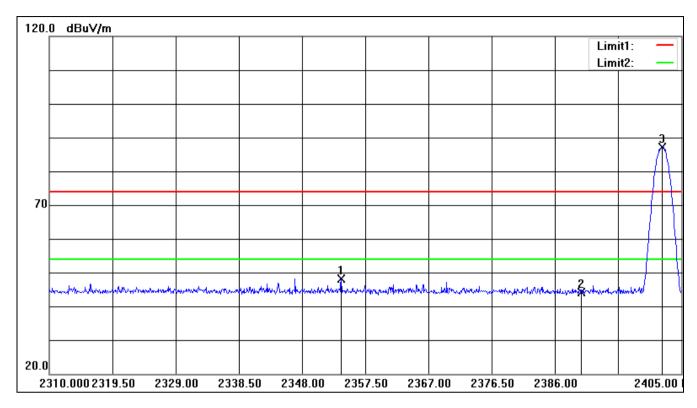


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Right Ear

Mode:b; Polarization:Horizontal; Modulation:GFSK; ; Channel:Low



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	2353.890	52.44	-4.34	48.10	74.00	-25.90	peak
2	2390.000	48.27	-4.24	44.03	74.00	-29.97	peak
3	2402.150	91.30	-4.21	87.09	74.00	13.09	peak



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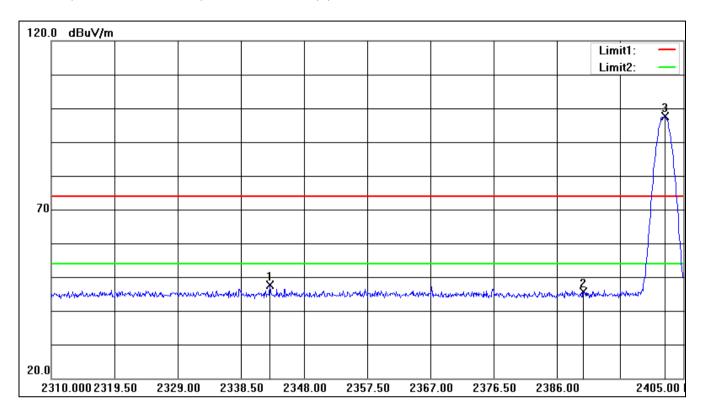
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Mode:b; Polarization:Vertical; Modulation:GFSK; ; Channel:Low



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	2342.870	51.97	-4.37	47.60	74.00	-26.40	peak
2	2390.000	49.75	-4.24	45.51	74.00	-28.49	peak
3	2402.245	101.79	-4.21	97.58	74.00	23.58	peak



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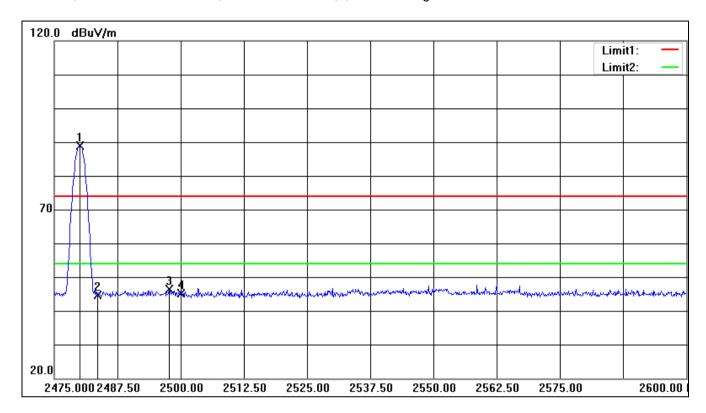
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Mode:b; Polarization:Horizontal; Modulation:GFSK; ; Channel:High



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	2480.125	92.82	-4.01	88.81	74.00	14.81	peak
2	2483.500	48.72	-4.00	44.72	74.00	-29.28	peak
3	2497.750	50.40	-3.97	46.43	74.00	-27.57	peak
4	2500.000	49.21	-3.96	45.25	74.00	-28.75	peak



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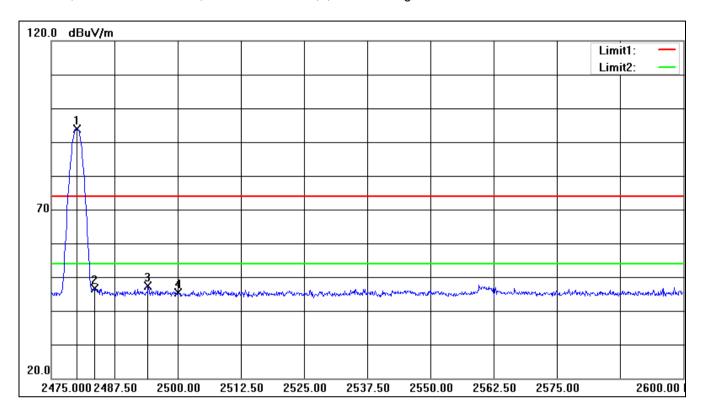
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Mode:b; Polarization:Vertical; Modulation:GFSK; ; Channel:High



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	2480.125	97.97	-4.01	93.96	74.00	19.96	peak
2	2483.500	50.75	-4.00	46.75	74.00	-27.25	peak
3	2494.125	51.46	-3.98	47.48	74.00	-26.52	peak
4	2500.000	49.44	-3.96	45.48	74.00	-28.52	peak



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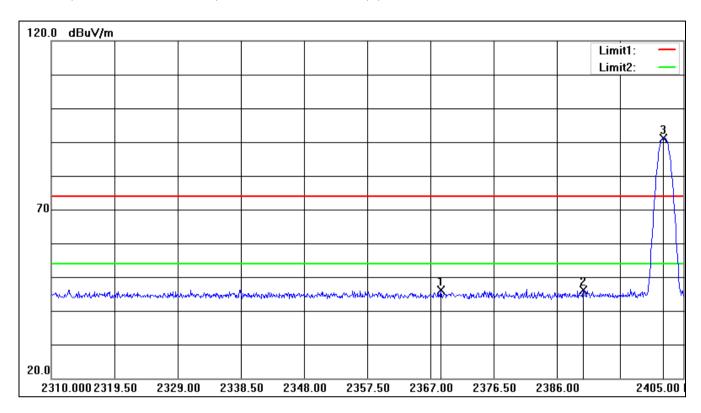
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Mode:b; Polarization:Horizontal; Modulation:π/4 DQPSK; ; Channel:Low



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	2368.520	50.36	-4.30	46.06	74.00	-27.94	peak
2	2390.000	50.27	-4.24	46.03	74.00	-27.97	peak
3	2401.960	95.29	-4.21	91.08	74.00	17.08	peak



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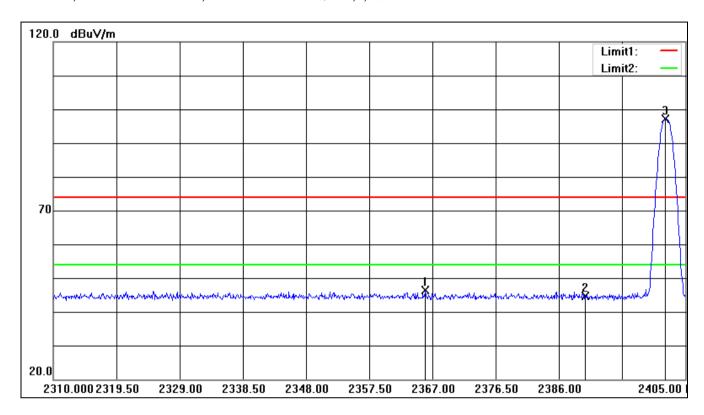
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Mode:b; Polarization:Vertical; Modulation:π/4 DQPSK; ; Channel:Low



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	2365.955	50.68	-4.31	46.37	74.00	-27.63	peak
2	2390.000	48.95	-4.24	44.71	74.00	-29.29	peak
3	2401.960	101.22	-4.21	97.01	74.00	23.01	peak



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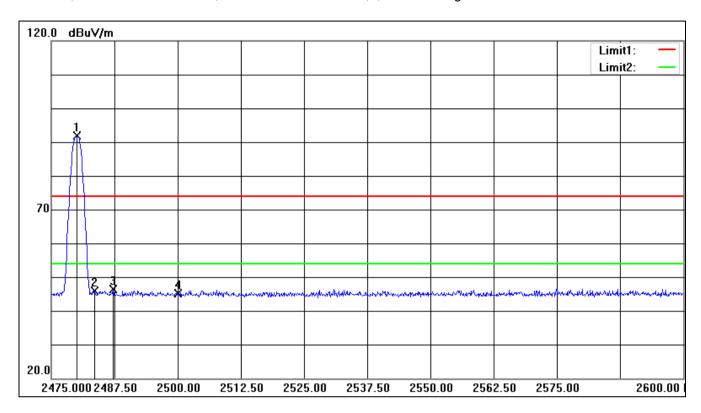
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Mode:b; Polarization:Horizontal; Modulation:π/4 DQPSK; ; Channel:High



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	2480.125	95.85	-4.01	91.84	74.00	17.84	peak
2	2483.500	49.78	-4.00	45.78	74.00	-28.22	peak
3	2487.250	50.26	-3.99	46.27	74.00	-27.73	peak
4	2500.000	49.01	-3.96	45.05	74.00	-28.95	peak



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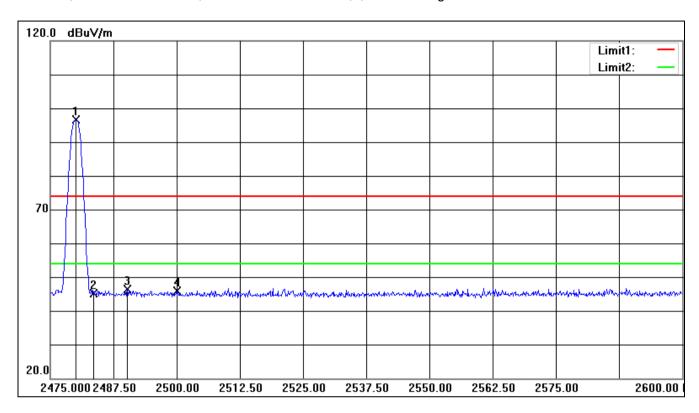
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Mode:b; Polarization:Vertical; Modulation:π/4 DQPSK; ; Channel:High



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	2480.125	100.53	-4.01	96.52	74.00	22.52	peak
2	2483.500	49.15	-4.00	45.15	74.00	-28.85	peak
3	2490.250	50.26	-3.99	46.27	74.00	-27.73	peak
4	2500.000	49.83	-3.96	45.87	74.00	-28.13	peak



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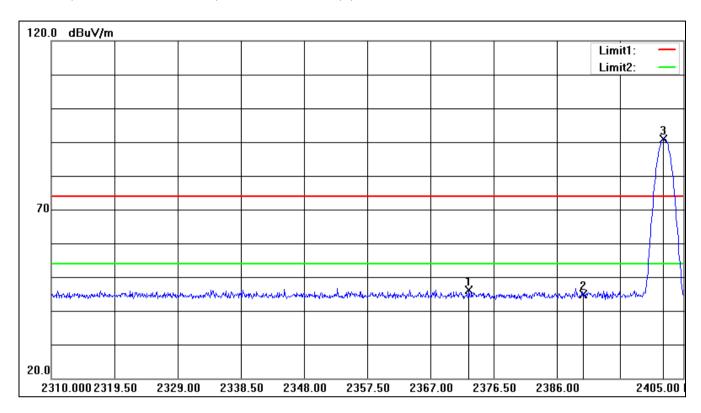
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Mode:b; Polarization:Horizontal; Modulation:8DPSK; ; Channel:Low



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	2372.795	50.43	-4.29	46.14	74.00	-27.86	peak
2	2390.000	49.00	-4.24	44.76	74.00	-29.24	peak
3	2402.055	95.15	-4.21	90.94	74.00	16.94	peak



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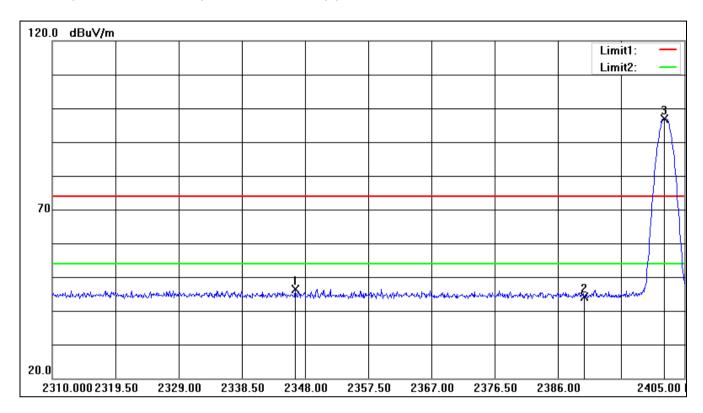
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Mode:b; Polarization:Vertical; Modulation:8DPSK; ; Channel:Low



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	2346.480	50.80	-4.36	46.44	74.00	-27.56	peak
2	2390.000	48.33	-4.24	44.09	74.00	-29.91	peak
3	2401.960	101.19	-4.21	96.98	74.00	22.98	peak



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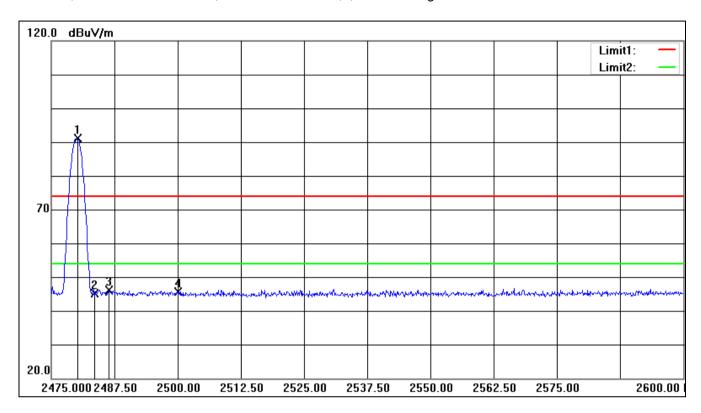
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Mode:b; Polarization:Horizontal; Modulation:8DPSK; ; Channel:High



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	2480.250	95.12	-4.01	91.11	74.00	17.11	peak
2	2483.500	49.24	-4.00	45.24	74.00	-28.76	peak
3	2486.375	50.03	-4.00	46.03	74.00	-27.97	peak
4	2500.000	49.59	-3.96	45.63	74.00	-28.37	peak



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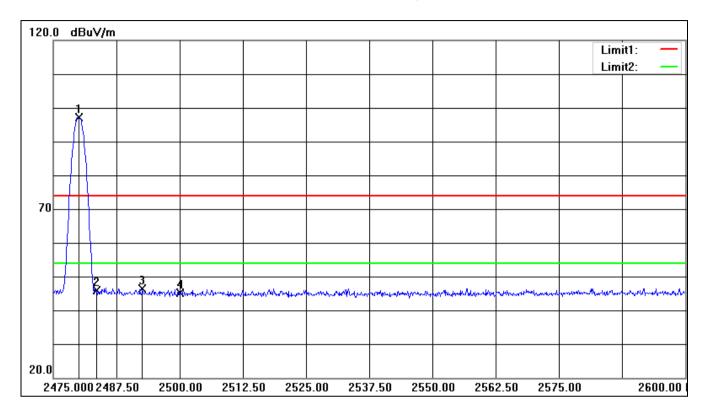
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Mode:b; Polarization:Vertical; Modulation:8DPSK; ; Channel:High



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	2480.125	101.12	-4.01	97.11	74.00	23.11	peak
2	2483.500	49.90	-4.00	45.90	74.00	-28.10	peak
3	2492.625	50.39	-3.98	46.41	74.00	-27.59	peak
4	2500.000	49.05	-3.96	45.09	74.00	-28.91	peak



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7.9 Radiated Spurious Emissions

Test Requirement 47 CFR Part 15, Subpart C 15.205 & 15.209
Test Method: ANSI C63.10 (2013) Section 6.4,6.5,6.6

Limit:

Frequency(MHz)	Field strength(microvolts/meter)	Measurement distance(meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

Remark: The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90kHz, 110-490kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation.



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7.9.1 E.U.T. Operation

Operating Environment:

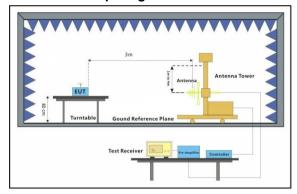
Temperature: 25 °C Humidity: 49 % RH Atmospheric Pressure: 1005 mbar

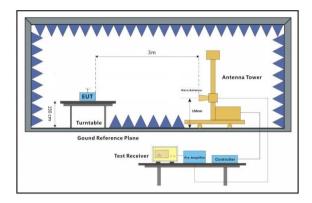
Test mode b:TX_non-Hop mode_Keep the EUT in continuously transmitting mode with GFSK

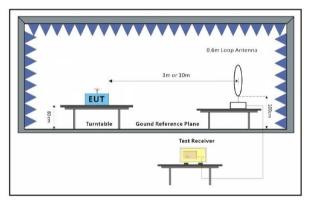
modulation, $\pi/4DQPSK$ modulation, 8DPSK modulation. All modes have been

tested and only the data of worst case is recorded in the report.

7.9.2 Test Setup Diagram









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7.9.3 Measurement Procedure and Data

- a. For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter fully-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- c. The EUT was set 3 or 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- d. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- e. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- f. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- g. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.
- h. Test the EUT in the lowest channel, the middle channel, the Highest channel.
- i. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.
- j. Repeat above procedures until all frequencies measured was complete.

Remark:

- 1) For emission below 1GHz, through pre-scan found the worst case is the lowest channel. Only the worst case is recorded in the report.
- 2) The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:

Final Test Level =Receiver Reading + Antenna Factor + Cable Factor - Preamplifier Factor

- 3) Scan from 9kHz to 25GHz, the disturbance above 18GHz and below 30MHz was very low. The points marked on above plots are the highest emissions could be found when testing, so only above points had been displayed. The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported.
- 4) For frequencies above 1GHz, the field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. For the emissions whose peak level is lower than the average limit, only the peak measurement is shown in the report.



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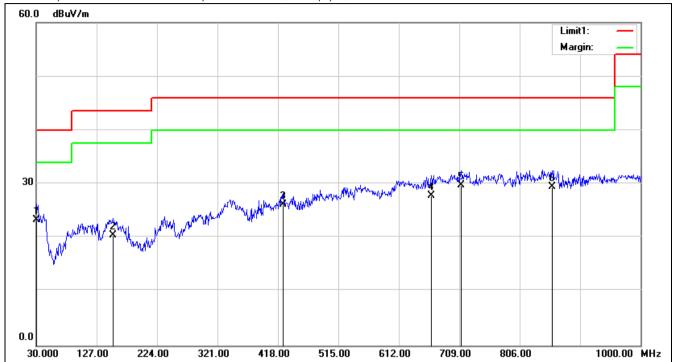




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Below 1GHz Left Ear

Mode:b; Polarization:Horizontal; Modulation:GFSK; ; Channel:Low



No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(deg.)	
1	30.9700	-2.02	25.38	23.36	40.00	-16.64	300	147	QP
2	153.1900	0.52	19.89	20.41	43.50	-23.09	200	49	QP
3	425.7600	2.18	23.96	26.14	46.00	-19.86	200	52	QP
4	664.3800	0.63	27.22	27.85	46.00	-18.15	100	186	QP
5	711.9100	2.24	27.50	29.74	46.00	-16.26	100	228	QP
6	858.3800	1.23	28.18	29.41	46.00	-16.59	200	307	QP



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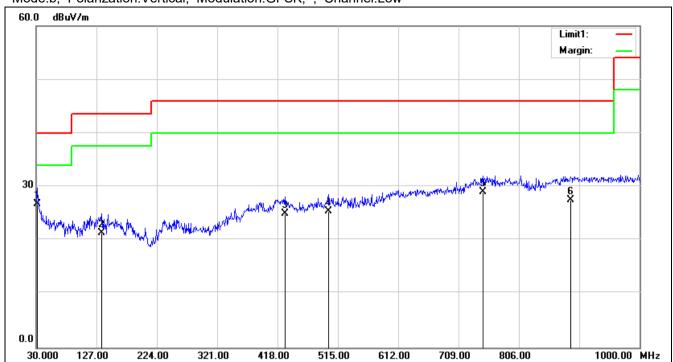


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Mode:b; Polarization:Vertical; Modulation:GFSK; ; Channel:Low



No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(deg.)	
1	31.9400	1.92	24.82	26.74	40.00	-13.26	200	118	QP
2	134.7600	1.80	19.64	21.44	43.50	-22.06	100	174	QP
3	429.6400	1.02	24.01	25.03	46.00	-20.97	100	39	QP
4	499.4800	0.24	25.23	25.47	46.00	-20.53	200	205	QP
5	747.8000	1.55	27.48	29.03	46.00	-16.97	300	174	QP
6	889.4200	-1.01	28.55	27.54	46.00	-18.46	300	18	QP



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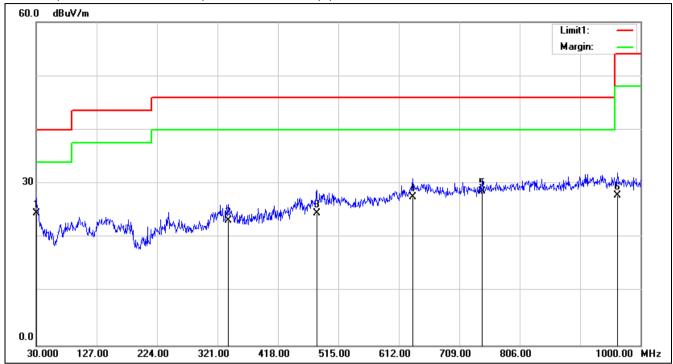




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Right Ear

Mode:b; Polarization:Horizontal; Modulation:GFSK; ; Channel:Low



No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(deg.)	
1	30.0000	-1.41	25.93	24.52	40.00	-15.48	100	115	QP
2	338.4600	1.14	21.97	23.11	46.00	-22.89	100	125	QP
3	480.0800	-0.33	24.87	24.54	46.00	-21.46	200	57	QP
4	634.3100	0.64	26.92	27.56	46.00	-18.44	200	305	QP
5	745.8600	1.16	27.48	28.64	46.00	-17.36	100	321	QP
6	963.1400	-1.41	29.27	27.86	54.00	-26.14	300	241	QP



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SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd.

Report No.: SHEM201201071101

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Mode:b; Polarization:Vertical; Modulation:GFSK; ; Channel:Low



No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(deg.)	
1	31.9400	1.66	24.82	26.48	40.00	-13.52	300	113	QP
2	151.2500	2.11	20.04	22.15	43.50	-21.35	200	29	QP
3	482.0200	3.61	24.91	28.52	46.00	-17.48	200	306	QP
4	624.6100	2.23	26.81	29.04	46.00	-16.96	100	93	QP
5	778.8400	1.73	27.68	29.41	46.00	-16.59	100	119	QP
6	919.4900	1.13	28.92	30.05	46.00	-15.95	300	227	QP



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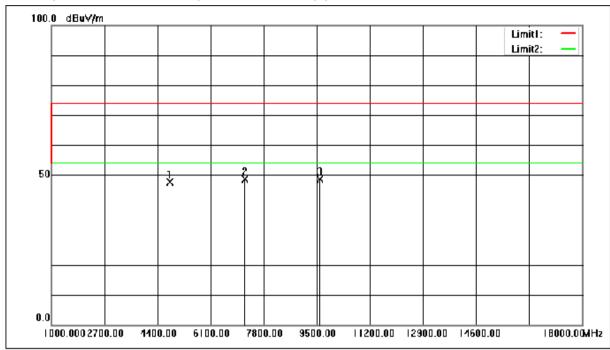
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Report No.: SHEM201201071101

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Above 1GHz Left Ear

Mode:b; Polarization:Horizontal; Modulation:GFSK; ; Channel:Low



No.	Frequency	Reading	Correction	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	4804.000	57.83	-10.28	47.55	74.00	-26.45	peak
2	7206.000	55.66	-7.10	48.56	74.00	-25.44	peak
3	9608.000	53.69	-4.96	48.73	74.00	-25.27	peak



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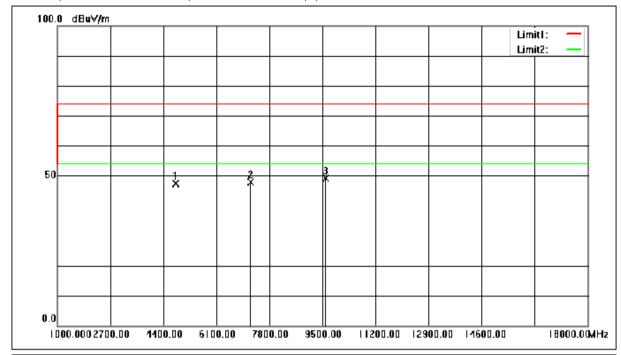
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Mode:b; Polarization:Vertical; Modulation:GFSK; ; Channel:Low



No.	Frequency	Reading	Correction	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	4804.000	57.54	-10.28	47.26	74.00	-26.74	peak
2	7206.000	54.99	-7.10	47.89	74.00	-26.11	peak
3	9608.000	54.21	-4.96	49.25	74.00	-24.75	peak



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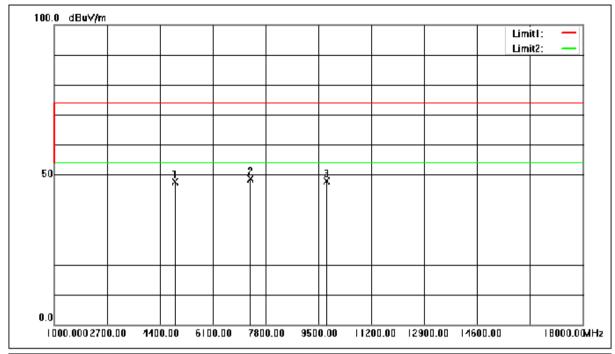
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Mode:b; Polarization:Horizontal; Modulation:GFSK; ; Channel:middle



No.	Frequency	Reading	Correction	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	4882.000	57.56	-9.98	47.58	74.00	-26.42	peak
2	7323.000	55.63	-6.91	48.72	74.00	-25.28	peak
3	9764.000	52.15	-4.23	47.92	74.00	-26.08	peak



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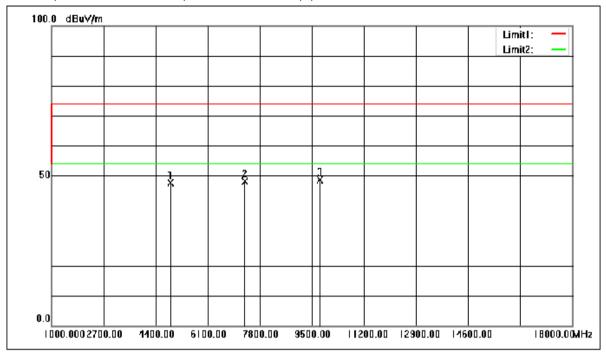
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Mode:b; Polarization:Vertical; Modulation:GFSK; ; Channel:middle



No.	Frequency	Reading	Correction	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	4882.000	57.49	-9.98	47.51	74.00	-26.49	peak
2	7323.000	55.15	-6.91	48.24	74.00	-25.76	peak
3	9764.000	52.78	-4.23	48.55	74.00	-25.45	peak



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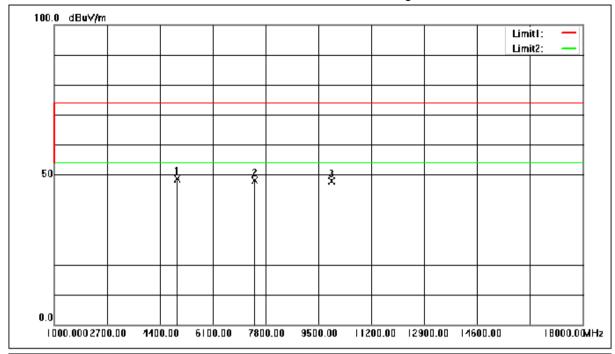
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Mode:b; Polarization:Horizontal; Modulation:GFSK; ; Channel:High



No.	Frequency	Reading	Correction	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	4960.000	58.41	-9.68	48.73	74.00	-25.27	peak
2	7440.000	54.94	-6.72	48.22	74.00	-25.78	peak
3	9920.000	51.30	-3.50	47.80	74.00	-26.20	peak



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Mode:b; Polarization:Vertical; Modulation:GFSK; ; Channel:High



No.	Frequency	Reading	Correction	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	4960.000	56.81	-9.68	47.13	74.00	-26.87	peak
2	7440.000	55.97	-6.72	49.25	74.00	-24.75	peak
3	9920.000	51.90	-3.50	48.40	74.00	-25.60	peak



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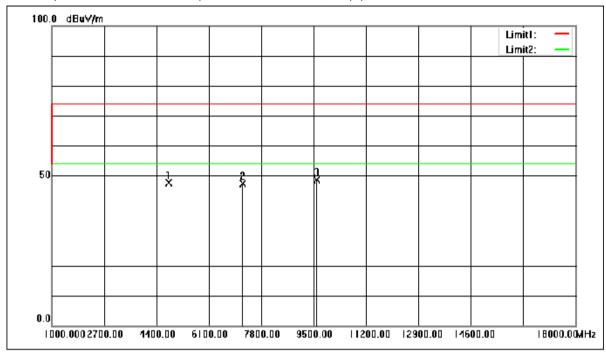
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Mode:b; Polarization:Horizontal; Modulation:π/4 DQPSK; ; Channel:Low



No.	Frequency	Reading	Correction	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	4804.000	57.95	-10.28	47.67	74.00	-26.33	peak
2	7206.000	54.48	-7.10	47.38	74.00	-26.62	peak
3	9608.000	53.53	-4.96	48.57	74.00	-25.43	peak



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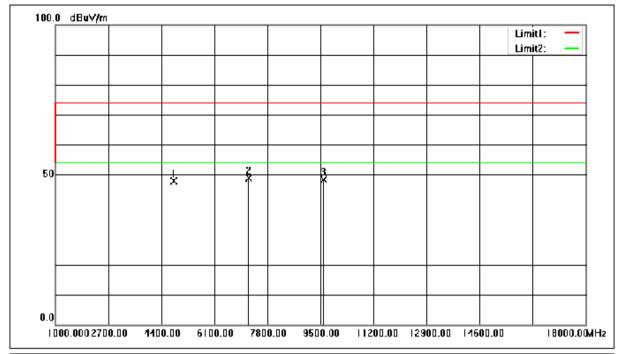
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Mode:b; Polarization:Vertical; Modulation:π/4 DQPSK; ; Channel:Low



No.	Frequency	Reading	Correction	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	4804.000	58.14	-10.28	47.86	74.00	-26.14	peak
2	7206.000	56.06	-7.10	48.96	74.00	-25.04	peak
3	9608.000	53.45	-4.96	48.49	74.00	-25.51	peak



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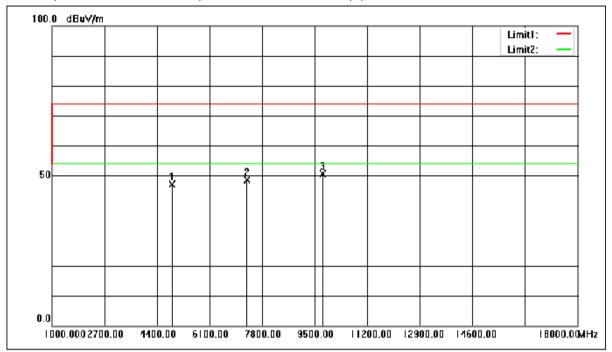
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Mode:b; Polarization:Horizontal; Modulation:π/4 DQPSK; ; Channel:middle



No.	Frequency	Reading	Correction	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	4882.000	57.20	-9.98	47.22	74.00	-26.78	peak
2	7323.000	55.48	-6.91	48.57	74.00	-25.43	peak
3	9764.000	54.89	-4.23	50.66	74.00	-23.34	peak



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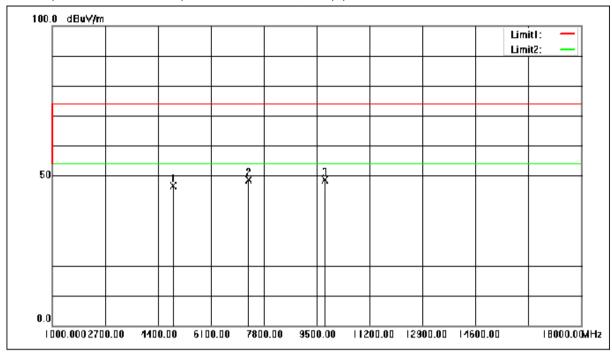
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Mode:b; Polarization:Vertical; Modulation:π/4 DQPSK; ; Channel:middle



No.	Frequency	Reading	Correction	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	4882.000	56.55	-9.98	46.57	74.00	-27.43	peak
2	7323.000	55.48	-6.91	48.57	74.00	-25.43	peak
3	9764.000	52.90	-4.23	48.67	74.00	-25.33	peak



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Mode:b; Polarization:Horizontal; Modulation:π/4 DQPSK; ; Channel:High



No.	Frequency	Reading	Correction	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	4960.000	58.25	-9.68	48.57	74.00	-25.43	peak
2	7440.000	55.29	-6.72	48.57	74.00	-25.43	peak
3	9920.000	51.09	-3.50	47.59	74.00	-26.41	peak



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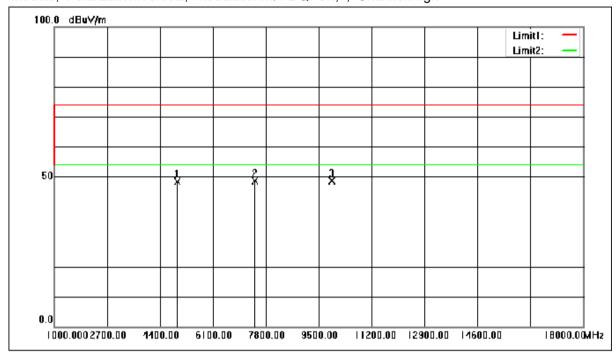
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Mode:b; Polarization:Vertical; Modulation:π/4 DQPSK; ; Channel:High



No.	Frequency	Reading	Correction	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	4960.000	57.95	-9.68	48.27	74.00	-25.73	peak
2	7440.000	55.23	-6.72	48.51	74.00	-25.49	peak
3	9920.000	52.07	-3.50	48.57	74.00	-25.43	peak



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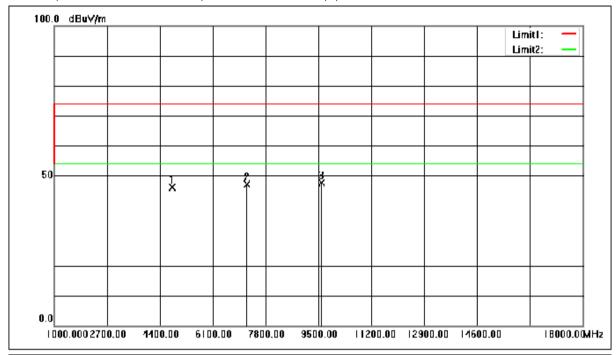
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Mode:b; Polarization:Horizontal; Modulation:8DPSK; ; Channel:Low



No.	Frequency	Reading	Correction	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	4804.000	56.46	-10.28	46.18	74.00	-27.82	peak
2	7206.000	54.33	-7.10	47.23	74.00	-26.77	peak
3	9608.000	52.54	-4.96	47.58	74.00	-26.42	peak



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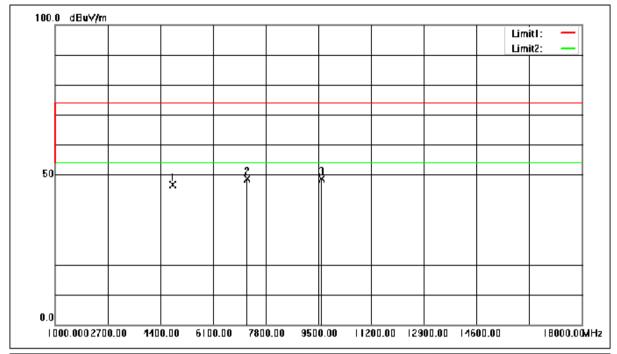
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Mode:b; Polarization:Vertical; Modulation:8DPSK; ; Channel:Low



No.	Frequency	Reading	Correction	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	4804.000	56.87	-10.28	46.59	74.00	-27.41	peak
2	7206.000	55.83	-7.10	48.73	74.00	-25.27	peak
3	9608.000	53.64	-4.96	48.68	74.00	-25.32	peak



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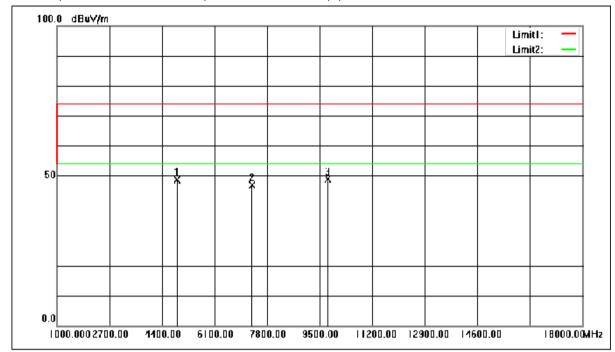
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Mode:b; Polarization:Horizontal; Modulation:8DPSK; ; Channel:middle



No.	Frequency	Reading	Correction	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	4882.000	58.70	-9.98	48.72	74.00	-25.28	peak
2	7323.000	53.86	-6.91	46.95	74.00	-27.05	peak
3	9764.000	52.99	-4.23	48.76	74.00	-25.24	peak



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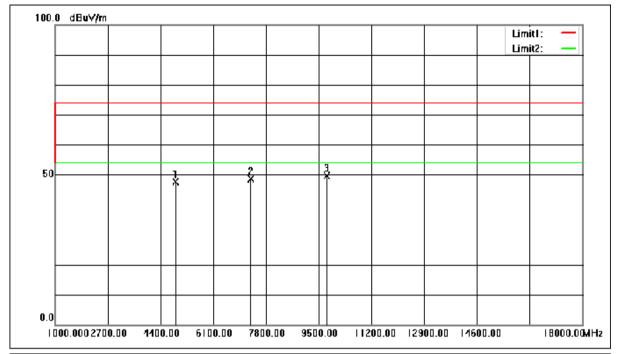
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Mode:b; Polarization:Vertical; Modulation:8DPSK; ; Channel:middle



No.	Frequency	Reading	Correction	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	4882.000	57.54	-9.98	47.56	74.00	-26.44	peak
2	7323.000	55.48	-6.91	48.57	74.00	-25.43	peak
3	9764.000	53.86	-4.23	49.63	74.00	-24.37	peak



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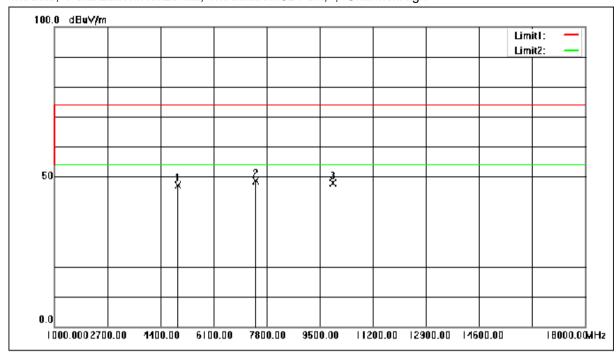
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Mode:b; Polarization:Horizontal; Modulation:8DPSK; ; Channel:High



No.	Frequency	Reading	Correction	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	4960.000	56.71	-9.68	47.03	74.00	-26.97	peak
2	7440.000	55.29	-6.72	48.57	74.00	-25.43	peak
3	9920.000	51.29	-3.50	47.79	74.00	-26.21	peak



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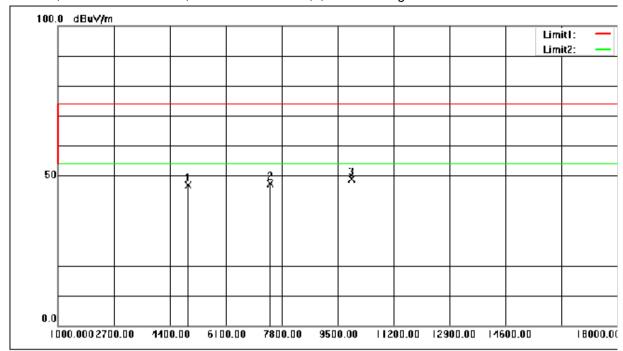
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Mode:b; Polarization:Vertical; Modulation:8DPSK; ; Channel:High



No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4960.000	56.65	-9.68	46.97	74.00	-27.03	peak
2	7440.000	54.00	-6.72	47.28	74.00	-26.72	peak
3	9920.000	52.26	-3.50	48.76	74.00	-25.24	peak



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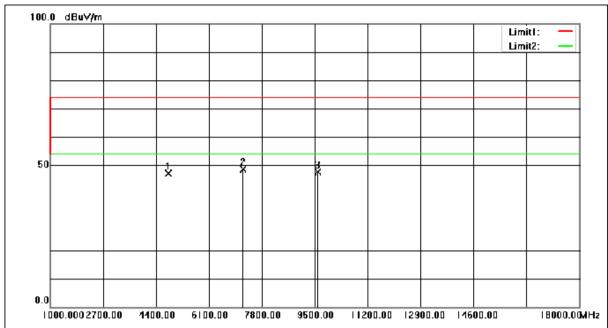
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Report No.: SHEM201201071101

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Right Ear

Mode:b; Polarization:Horizontal; Modulation:GFSK; ; Channel:Low



No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4804.000	57.53	-10.28	47.25	74.00	-26.75	peak
2	7206.000	55.75	-7.10	48.65	74.00	-25.35	peak
3	9608.000	52.54	-4.96	47.58	74.00	-26.42	peak



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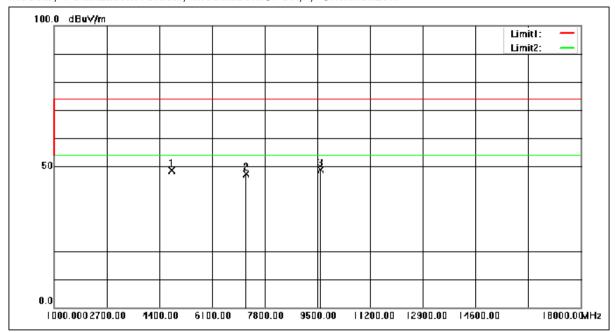
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Mode:b; Polarization:Vertical; Modulation:GFSK; ; Channel:Low



No.	Frequency	Reading	Correction	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	4804.000	58.79	-10.28	48.51	74.00	-25.49	peak
2	7206.000	54.38	-7.10	47.28	74.00	-26.72	peak
3	9608.000	53.72	-4.96	48.76	74.00	-25.24	peak



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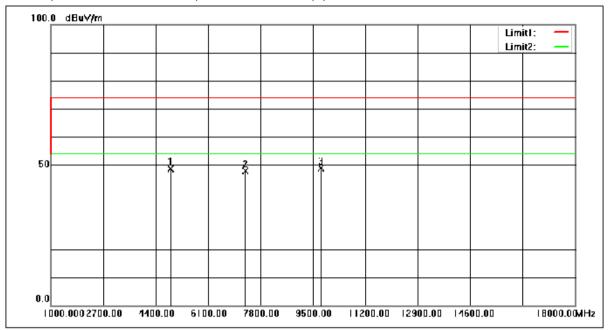
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Mode:b; Polarization:Horizontal; Modulation:GFSK; ; Channel:middle



No.	Frequency	Reading	Correction	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	4882.000	58.63	-9.98	48.65	74.00	-25.35	peak
2	7323.000	54.69	-6.91	47.78	74.00	-26.22	peak
3	9764.000	53.18	-4.23	48.95	74.00	-25.05	peak



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Mode:b; Polarization:Vertical; Modulation:GFSK; ; Channel:middle



No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4882.000	57.84	-9.98	47.86	74.00	-26.14	peak
2	7323.000	54.99	-6.91	48.08	74.00	-25.92	peak
3	9764.000	52.16	-4.23	47.93	74.00	-26.07	peak



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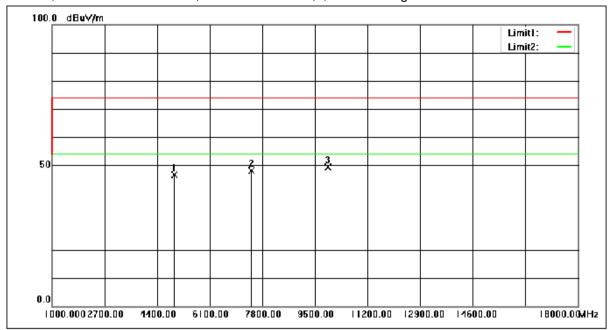
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Mode:b; Polarization:Horizontal; Modulation:GFSK; ; Channel:High



No.	Frequency	Reading	Correction	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	4960.000	56.43	-9.68	46.75	74.00	-27.25	peak
2	7440.000	54.92	-6.72	48.20	74.00	-25.80	peak
3	9920.000	52.76	-3.50	49.26	74.00	-24.74	peak



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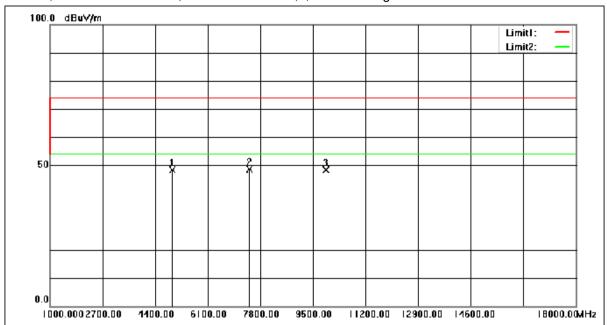
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Mode:b; Polarization:Vertical; Modulation:GFSK; ; Channel:High



No.	Frequency	Reading	Correction	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	4960.000	58.05	-9.68	48.37	74.00	-25.63	peak
2	7440.000	55.29	-6.72	48.57	74.00	-25.43	peak
3	9920.000	51.94	-3.50	48.44	74.00	-25.56	peak



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Mode:b; Polarization:Horizontal; Modulation:π/4 DQPSK; ; Channel:Low



No.	Frequency	Reading	Correction	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	4804.000	57.25	-10.28	46.97	74.00	-27.03	peak
2	7206.000	55.67	-7.10	48.57	74.00	-25.43	peak
3	9608.000	54.53	-4.96	49.57	74.00	-24.43	peak



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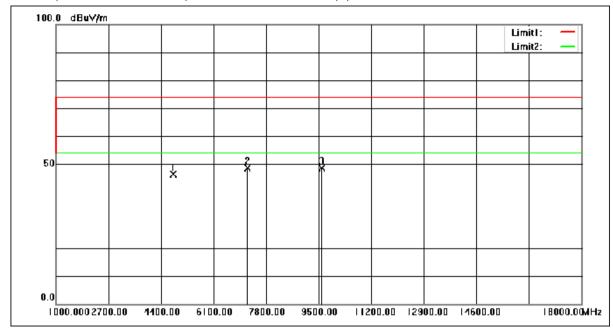
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Mode:b; Polarization:Vertical; Modulation:π/4 DQPSK; ; Channel:Low



No.	Frequency	Reading	Correction	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	4804.000	56.55	-10.28	46.27	74.00	-27.73	peak
2	7206.000	55.85	-7.10	48.75	74.00	-25.25	peak
3	9608.000	53.62	-4.96	48.66	74.00	-25.34	peak



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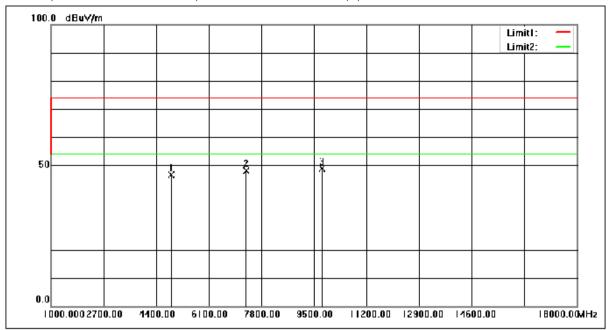
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Mode:b; Polarization:Horizontal; Modulation:π/4 DQPSK; ; Channel:middle



No.	Frequency	Reading	Correction	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	4882.000	56.70	-9.98	46.72	74.00	-27.28	peak
2	7323.000	54.98	-6.91	48.07	74.00	-25.93	peak
3	9764.000	53.08	-4.23	48.85	74.00	-25.15	peak



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Mode:b; Polarization:Vertical; Modulation:π/4 DQPSK; ; Channel:middle



No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4882.000	58.60	-9.98	48.62	74.00	-25.38	peak
2	7323.000	55.67	-6.91	48.76	74.00	-25.24	peak
3	9764.000	52.44	-4.23	48.21	74.00	-25.79	peak



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Mode:b; Polarization:Horizontal; Modulation:π/4 DQPSK; ; Channel:High



No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4960.000	55.35	-9.68	45.67	74.00	-28.33	peak
2	7440.000	55.41	-6.72	48.69	74.00	-25.31	peak
3	9920.000	52.28	-3.50	48.78	74.00	-25.22	peak



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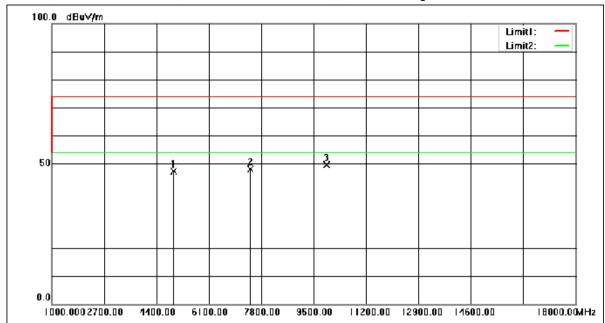
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Mode:b; Polarization:Vertical; Modulation:π/4 DQPSK; ; Channel:High



No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4960.000	56.96	-9.68	47.28	74.00	-26.72	peak
2	7440.000	54.97	-6.72	48.25	74.00	-25.75	peak
3	9920.000	53.02	-3.50	49.52	74.00	-24.48	peak



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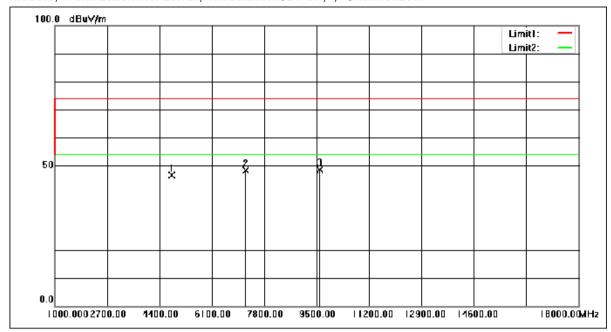
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Mode:b; Polarization:Horizontal; Modulation:8DPSK; ; Channel:Low



No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4804.000	57.03	-10.28	46.75	74.00	-27.25	peak
2	7206.000	55.47	-7.10	48.37	74.00	-25.63	peak
3	9608.000	53.57	-4.96	48.61	74.00	-25.39	peak



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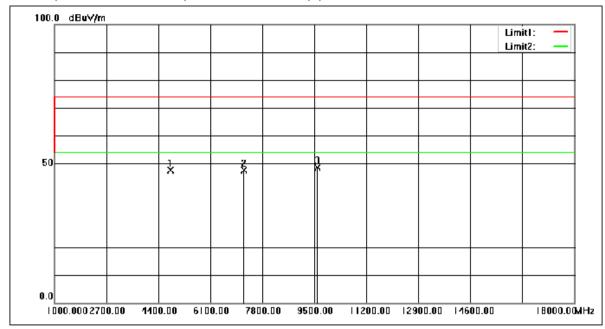
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Mode:b; Polarization:Vertical; Modulation:8DPSK; ; Channel:Low



No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4804.000	57.84	-10.28	47.56	74.00	-26.44	peak
2	7206.000	54.66	-7.10	47.56	74.00	-26.44	peak
3	9608.000	53.48	-4.96	48.52	74.00	-25.48	peak



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Mode:b; Polarization:Horizontal; Modulation:8DPSK; ; Channel:middle



No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4882.000	58.60	-9.98	48.62	74.00	-25.38	peak
2	7323.000	55.67	-6.91	48.76	74.00	-25.24	peak
3	9764.000	53.09	-4.23	48.86	74.00	-25.14	peak



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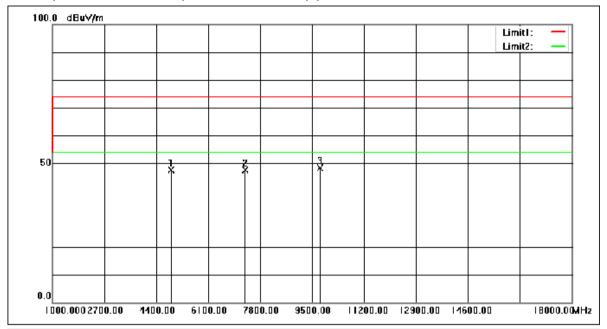
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Mode:b; Polarization:Vertical; Modulation:8DPSK; ; Channel:middle



No.	Frequency	Reading	Correction	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	4882.000	57.67	-9.98	47.69	74.00	-26.31	peak
2	7323.000	54.43	-6.91	47.52	74.00	-26.48	peak
3	9764.000	52.56	-4.23	48.33	74.00	-25.67	peak



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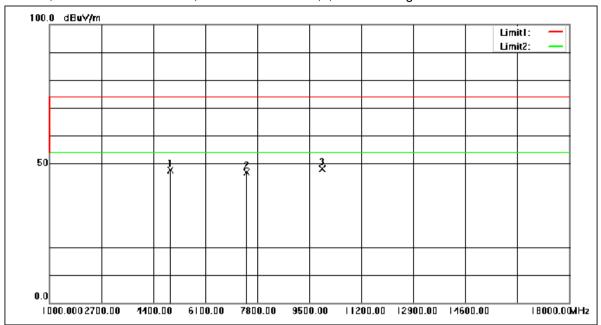
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Mode:b; Polarization:Horizontal; Modulation:8DPSK; ; Channel:High



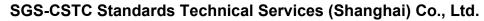
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1	4960.000	57.36	-9.68	47.68	74.00	-26.32	peak
2	7440.000	53.59	-6.72	46.87	74.00	-27.13	peak
3	9920.000	51.74	-3.50	48.24	74.00	-25.76	peak



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Mode:b; Polarization:Vertical; Modulation:8DPSK; ; Channel:High



No.	Frequency	Reading	Correction	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	4960.000	58.44	-9.68	48.76	74.00	-25.24	peak
2	7440.000	55.29	-6.72	48.57	74.00	-25.43	peak
3	9920.000	53.25	-3.50	49.75	74.00	-24.25	peak



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8 Photographs

Refer to the < Test Setup photos-FCC>.

9 EUT Constructional Details

Refer to the < External Photos > & < Internal Photos >.

- End of the Report -



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