

EMC

TEST REPORT

Report No. : 150700404TWN-001
Model No. : T-7XI-03-C, T-7XE-05-C
HURESAC-7XI-03-C
HURESAC-7XE-05-C
Issued Date: Oct. 07, 2015

Applicant: Johnson Health Tech. Co., Ltd.
No. 999, Sec. 2, Dongda Rd., Daya Dist., Taichung City
428, Taiwan

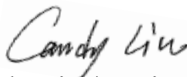
Test Method/ Standard: 47 CFR FCC Part 15.249 & ANSI C63.10:2013

Test By: Intertek Testing Services Taiwan Ltd.
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93910

**FCC Laboratory
Registration Number:**

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Revision History

Report No.	Issue Date	Revision Summary
150700404TWN-001	Oct. 07, 2015	Original report



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Summary of Tests

Test	Reference	Results
Radiated Emission test	15.249(c), 15.209	Pass
Emission on the Band Edge	15.249(d)	Pass
Conducted Emission of AC Power	15.207	Pass
20dB Bandwidth	15.215(c)	Pass

1. General information

1.1 Identification of the EUT

Product:	Console for Exercise Machine
Model No.:	T-7XI-03-C
Radio Module:	XIOB-BF535WF
Brand Name:	Matrix Fitness
FCC ID:	TN77XIGENERATIONS
Manufacturer:	Johnson Health Tech. Co., Ltd.
Address:	No. 999, Sec. 2, Dongda Rd., Daya Dist., Taichung City 428, Taiwan
Frequency Range:	2402MHz~2480MHz
Total Hopping Channel No:	79 channels
Frequency of Each Channel:	2402+1k MHz, k=0~78
Type of Modulation:	GFSK, $\pi/4$ DQSP, 8DPSK
Rated Power:	DC 12 from adapter
Power Cord:	N/A
Data Cable:	N/A
Sample Received:	Jun. 26, 2015
Test Date(s):	Aug. 21, 2015 ~ Oct. 02, 2015
Note 1:	This report is for the exclusive use of Intertek's Client and is provided pursuant to the agreement between Intertek and its Client. Intertek's responsibility and liability are limited to the terms and conditions of the agreement. Intertek assumes no liability to any party, other than to the Client in accordance with the agreement, for any loss, expense or damage occasioned by the use of this report. Only the Client is authorized to permit copying or distribution of this report and then only in its entirety. Any use of the Intertek name or one of its marks for the sale or advertisement of the tested material, product or service must first be approved in writing by Intertek. The observations and test results in this report are relevant only to the sample tested. This report by itself does not imply that the material, product, or service is or has ever been under an Intertek certification program.
Note 2:	When determining the test conclusion, the Measurement Uncertainty of test has been considered.

1.2 Additional information about the EUT

The customer confirmed the models listed as below were series model to model T-7XI-03C (EUT), the difference between main model and series model are listed as below.

Trade Name	Model Number	Different
Matrix Fitness	T-7XI-03C	18.5" Touch screen LCD(PCAP)
	T-7XE-05C	15.6" Touch screen LCD (Capacitive touch screen)
	HURESAC-7XI-03-C	15.6" Touch screen LCD(PCAP)
	HURESAC-7XE-05-C	15.6" Touch screen LCD(Capacitive touch screen)

Modulation mode	Transmit path
	Chain 0 / Main
GFSK	V
$\pi/4$ DQPSK	V
8DPSK	V

Product SW version : GUI 1.0 、 i/o 1.0 、 OS 1.0
Product HW version : 40EB
Radio SW version : 6.10.197.115 FWID 01-d0237f3a
Radio HW version : 60BA
Test SW Version : GUI 0.9.4.0 、 i/o 211 、 OS 0.2.1.2

1.3 Antenna description

The antenna is affixed to the EUT using a unique connector, which allows for replacement of a broken antenna, but DOES NOT use a standard antenna jack or electrical connector..

Antenna Gain : 2.0 dBi
Antenna Type : PIFA Antenna
Connector Type : I-PEX



1.4 Peripherals equipment

Peripherals	Brand	Model No.	Serial No.	Data cable
Notebook PC	DELL	Latitude D610	1YWZK1S	Micro USB cable 1 meter × 1
Adapter	N/A	LSE0107A1240	N/A	N/A

2. Test specifications

2.1 Test standard

The EUT was performed according to the procedures in FCC Part 15 Subpart C Paragraph 15.249 for non-spread spectrum devices.

The test of radiated measurements according to FCC Part15 Section 15.33(a) had been conducted and the field strength of this frequency band was all meet limit requirement, thus we evaluate the EUT pass the specified test.

2.2 Operation mode

The EUT was supplied with DC 12V from adapter

TX/RX mode: TX-MODE based on “PC Frequency Test Tool” to execute, and select different frequency and modulation.

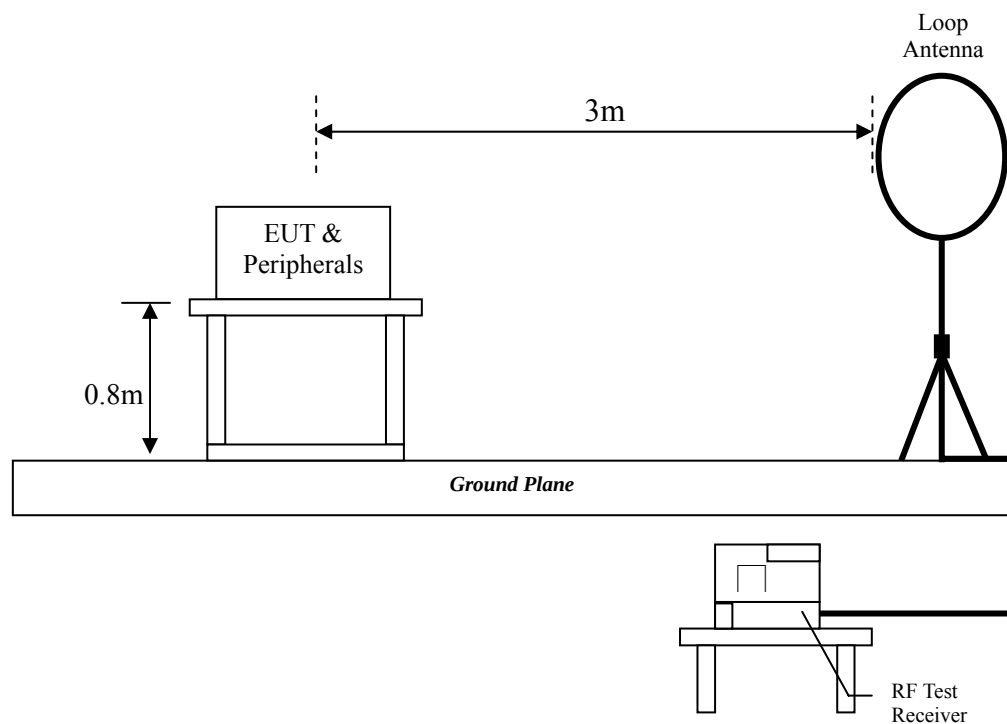
3. Radiated emission test FCC 15.249 (C)

3.1 Operating environment

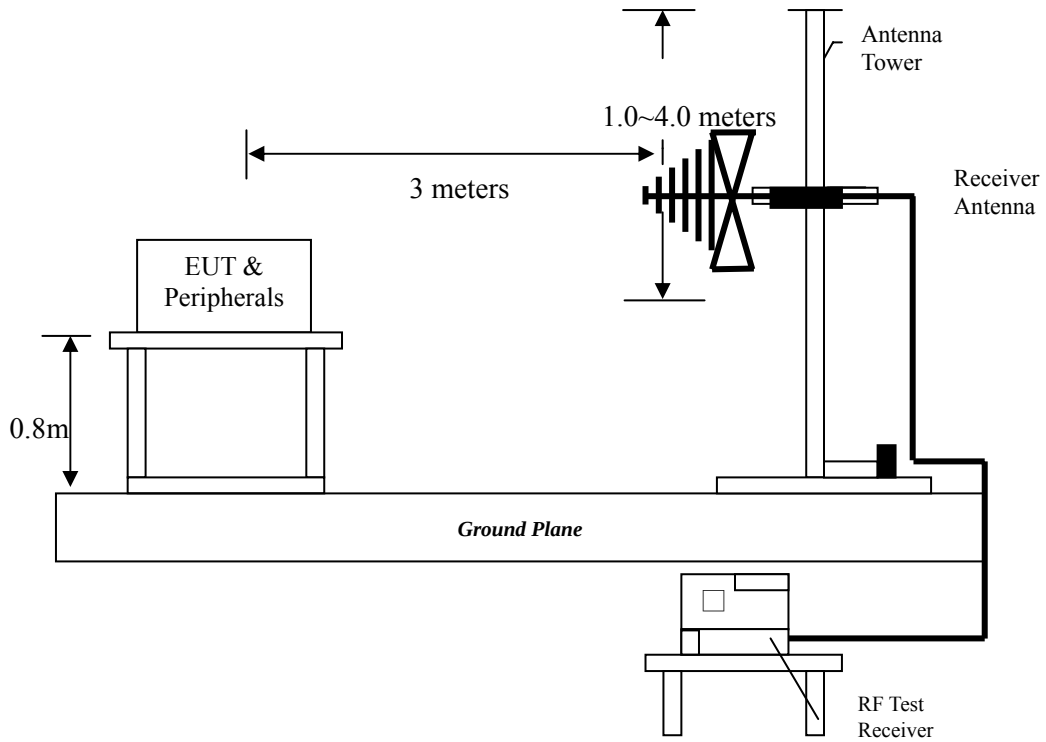
Temperature:	25	°C
Relative Humidity:	55	%
Atmospheric Pressure	1008	hPa

3.2 Test setup & procedure

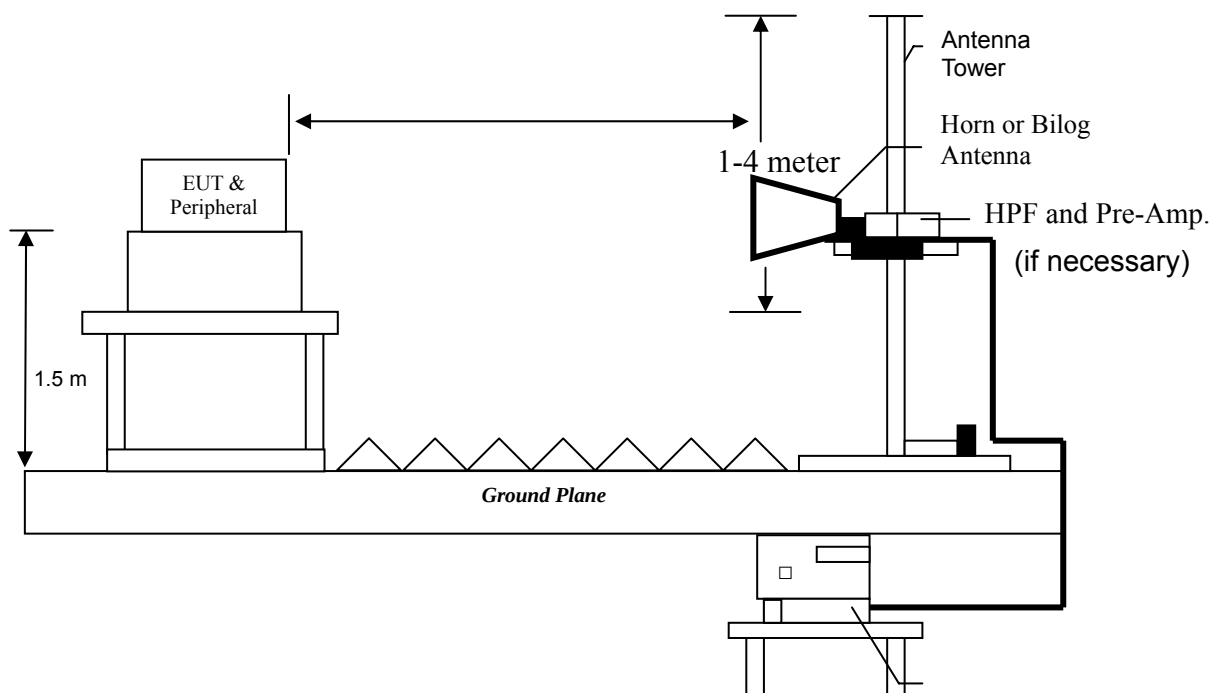
Radiated emission from 9 kHz to 30 MHz uses Loop Antenna:



Radiated emission from 30 MHz to 1 GHz uses Bilog Antenna:



Radiated emission above 1 GHz uses Horn Antenna:



Radiated emissions were investigated cover the frequency range from 30MHz to 1000MHz using a receiver RBW of 120kHz record QP reading, and the frequency over 1GHz using a spectrum analyzer RBW of 1MHz and 10Hz VBW record Average reading. (15.209 paragraph), the Peak reading (1 MHz RBW/ 3 MHz VBW) recorded also on the report. Place the measurement antenna away from each area of the EUT determined to be a source of emissions at the specified measurement distance, while keeping the measurement antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response.

The EUT for testing is arranged on a turntable. If some peripherals apply to the EUT, the peripherals will be connected to EUT and the whole system. During the test, all cables were arranged to produce worst-case emissions. The signal is maximized through rotation. The height of antenna and polarization is changing constantly for exploring for maximum signal level. The height of antenna can be up to 4 meters and down to 1 meter.

The measurement for radiated emission will be done at the distance of three meters unless the signal level is too low to measure at that distance. In the case of the reading under noise floor, a pre-amplifier is used and/or the test is conducted at a closer distance. And then all readings are extrapolated back to the equivalent three meter reading using inverse scaling with distance.

The EUT configurations please refer to the “Spurious set-up photo.pdf”.

3.3 Emission limit

3.3.1 Fundamental and harmonics emission limits

Frequency (MHz)	Field Strength of Fundamental		Field Strength of Harmonics	
	(mV/m@3m)	(dBuV/m@3m)	(uV/m@3m)	(dBuV/m@3m)
2400-2483.5	50	94	500	54

3.3.2 General radiated emission limits

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50dB below the level of the fundamental or to the general radiated emission limits in paragraph 15.209, whichever is the lesser attenuation.

Frequency MHz	15.209 Limits (dB μ V/m@3m)
30-88	40
88-216	43.5
216-960	46
Above 960	54

Remark:

1. In the above table, the tighter limit applies at the band edges.
2. Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system

Measurement uncertainty was calculated in accordance with TR 100 028-1.

Parameter	Uncertainty
Radiated Emission	Vertical: 4.13 dB Horizontal: 3.85 dB
Conducted Emission	2.08 dB.

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

3.4 Radiated spurious emission test data

3.4.1 Measurement results: frequencies 9kHz ~ 30MHz

The test was performed on EUT continuously transmitting mode.

EUT : T-7XI-03-C

Frequency (MHz)	Detection value	factor (dB/m)	Reading (dBμV)	value (dBμV/m)	Limit @ 3m (dBμV/m)	Tolerance (dB)
2.15	QP	21.39	31.86	53.25	69.54	-16.29
16.32	QP	22.24	19.23	41.46	69.54	-28.08
20.20	QP	22.19	14.66	36.85	69.54	-32.69

Remark: Corr. Factor = Antenna Factor + Cable Loss

3.4.2 Measurement results: frequencies equal to or less than 1 GHz

The test was performed on EUT under GFSK, $\pi/4$ DQSP, & 8-DPSK continuously transmitting mode. Channel 0, 39, 78 were verified. The worst case occurred at 8-DPSK TX Channel 0

EUT : T-7XI-03-C
Test Condition : 8-DPSK TX Channel 0

Antenna Polariz. (V/H)	Freq. (MHz)	Receiver Detector	Corr. Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)
Vertical	95.96	QP	9.04	31.30	40.34	43.50	-3.16
Vertical	148.34	QP	14.55	24.22	38.77	43.50	-4.73
Vertical	243.40	QP	13.97	26.07	40.04	46.00	-5.96
Vertical	270.56	QP	14.72	26.39	41.10	46.00	-4.90
Vertical	297.72	QP	15.68	24.37	40.05	46.00	-5.95
Vertical	487.84	QP	20.36	20.72	41.08	46.00	-4.92
Horizontal	247.28	QP	14.07	28.97	43.04	46.00	-2.96
Horizontal	270.56	QP	14.72	30.34	45.06	46.00	-0.94
Horizontal	297.72	QP	15.68	27.57	43.25	46.00	-2.75
Horizontal	346.22	QP	17.02	26.27	43.29	46.00	-2.71
Horizontal	398.60	QP	18.35	27.31	45.66	46.00	-0.34

Remark:

1. Corr. Factor = Antenna Factor + Cable Loss
2. Corrected Level = Reading + Corr. Factor

3.4.3 Measurement results: frequency above 1GHz

Mode	Frequency (MHz)	Spectrum Analyzer Detector	Ant. Pol. (H/V)	Preamp. Gain (dB)	Correction Factor (dB/m)	Reading (dBμV)	Corrected Reading (dBμV/m)	Limit @ 3 m (dBμV/m)	Margin (dB)
GFSK Ch_Low	3180	PK	V	39.87	-3.75	46.81	43.06	74.00	-30.94
	4804	PK	V	40.13	-0.10	46.29	46.19	74.00	-27.81
	4804	PK	H	40.13	-0.10	47.29	47.19	74.00	-26.81
	5040	PK	H	39.64	0.80	42.69	43.49	74.00	-30.51
GFSK Ch_Middle	4882	PK	V	39.99	0.16	52.34	52.50	74.00	-21.50
	6300	PK	V	38.28	5.41	42.35	47.76	74.00	-26.24
	4882	PK	H	39.99	0.16	57.09	57.25	74.00	-16.75
	4882	AV	H	39.99	0.16	41.09	41.25	54.00	-12.75
GFSK Ch_High	4960	PK	V	39.84	0.41	52.12	52.53	74.00	-21.47
	6300	PK	V	38.28	5.41	41.67	47.08	74.00	-26.92
	4960	PK	H	39.84	0.41	56.99	57.40	74.00	-16.60
	4960	PK	H	39.84	0.41	38.98	39.39	54.00	-14.61

Remark:

1. Correction Factor = Antenna Factor + Cable Loss + Power Amplifier
2. Corrected Level = Reading + Correction Factor
3. The frequency measured ranges from 1 GHz to 25 GHz. The data value listed above which is higher than the system noise floor.

Mode	Frequency (MHz)	Spectrum Analyzer Detector	Ant. Pol. (H/V)	Preamp. Gain (dB)	Correction Factor (dB/m)	Reading (dBμV)	Corrected Reading (dBμV/m)	Limit @ 3 m (dBμV/m)	Margin (dB)
$\pi/4$ -DQPSK Ch_Low	4804	PK	V	40.13	-0.10	49.06	48.96	74.00	-25.04
	6300	PK	V	38.28	5.41	42.16	47.57	74.00	-26.43
	4804	PK	H	40.13	-0.10	48.32	48.22	74.00	-25.78
$\pi/4$ -DQPSK Ch_Middle	4882	PK	V	39.99	0.16	51.38	51.54	74.00	-22.46
	6300	PK	V	38.28	5.41	42.24	47.65	74.00	-26.35
	4882	PK	H	39.99	0.16	55.54	55.70	74.00	-18.30
	4882	AV	H	39.99	0.16	44.48	44.64	54.00	-9.36
$\pi/4$ -DQPSK Ch_High	4960	PK	V	39.84	0.41	52.49	52.90	74.00	-21.10
	6300	PK	V	38.28	5.41	42.01	47.42	74.00	-26.58
	4960	PK	H	39.84	0.41	53.79	54.20	74.00	-19.80
	4960	AV	H	39.84	0.41	42.74	43.15	54.00	-10.85

Remark:

1. Correction Factor = Antenna Factor + Cable Loss + Power Amplifier
2. Corrected Level = Reading + Correction Factor
3. The frequency measured ranges from 1 GHz to 25 GHz. The data value listed above which is higher than the system noise floor.

Mode	Frequency (MHz)	Spectrum Analyzer Detector	Ant. Pol. (H/V)	Preamp. Gain (dB)	Correction Factor (dB/m)	Reading (dBμV)	Corrected Reading (dBμV/m)	Limit @ 3 m (dBμV/m)	Margin (dB)
8DPSK Ch_Low	3180	PK	V	39.87	-3.75	46.40	42.65	74.00	-31.35
	4804	PK	V	40.13	-0.10	48.09	47.99	74.00	-26.01
	6300	PK	V	38.28	5.41	41.67	47.08	74.00	-26.92
	4804	PK	H	40.13	-0.10	49.54	49.44	74.00	-24.56
8DPSK Ch_Middle	3180	PK	V	39.87	-3.75	47.01	43.26	74.00	-30.74
	4882	PK	V	39.99	0.16	52.32	52.48	74.00	-21.52
	6300	PK	V	38.28	5.41	42.63	48.04	74.00	-25.96
	4882	PK	H	39.99	0.16	49.64	49.80	74.00	-24.20
8DPSK Ch_High	3180	PK	V	39.87	-3.75	46.94	43.19	74.00	-30.81
	4960	PK	V	39.84	0.41	52.58	52.99	74.00	-21.01
	6300	PK	V	38.28	5.41	41.39	46.80	74.00	-27.20
	4960	PK	H	39.84	0.41	53.30	53.71	74.00	-20.29

Remark:

1. Correction Factor = Antenna Factor + Cable Loss + Power Amplifier
2. Corrected Level = Reading + Correction Factor
3. The frequency measured ranges from 1 GHz to 25 GHz. The data value listed above which is higher than the system noise floor.

3.4.5 Measurement results: Fundamental and harmonics emission

Mode	Channel	Frequency (MHz)	Spectrum Analyzer	Ant. Pol. (H/V)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Reading (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)
GFSK	Ch0	2402	PK	V	32.59	68.88	101.47	114	-12.53
	Ch0	2402	AV	V	32.59	35.45	68.04	94	-25.96
	Ch0	2402	PK	H	32.59	67.92	100.51	114	-13.49
	Ch0	2402	AV	H	32.59	37.61	70.20	94	-23.80
	Ch39	2441	PK	V	32.63	66.25	98.88	114	-15.12
	Ch39	2441	AV	V	32.63	33.87	66.50	94	-27.50
	Ch39	2441	PK	H	32.63	66.27	98.90	114	-15.10
	Ch39	2441	AV	H	32.63	32.29	64.92	94	-29.08
	Ch78	2480	PK	V	32.64	66.36	99.00	114	-15.00
	Ch78	2480	AV	V	32.64	33.33	65.97	94	-28.03
	Ch78	2480	PK	H	32.64	65.50	98.14	114	-15.86
	Ch78	2480	AV	H	32.64	32.35	64.99	94	-29.01
$\pi/4$ -DPSK	Ch0	2402	PK	V	32.59	68.75	101.34	114	-12.66
	Ch0	2402	AV	V	32.59	41.09	73.68	94	-20.32
	Ch0	2402	PK	H	32.59	68.09	100.68	114	-13.32
	Ch0	2402	AV	H	32.59	48.63	81.22	94	-12.78
	Ch39	2441	PK	V	32.63	66.54	99.17	114	-14.83
	Ch39	2441	AV	V	32.63	48.24	80.87	94	-13.13
	Ch39	2441	PK	H	32.63	68.26	100.89	114	-13.11
	Ch39	2441	AV	H	32.63	45.34	77.97	94	-16.03
	Ch78	2480	PK	V	32.64	65.85	98.49	114	-15.51
	Ch78	2480	AV	V	32.64	44.67	77.31	94	-16.69
	Ch78	2480	PK	H	32.64	64.79	97.43	114	-16.57
	Ch78	2480	AV	H	32.64	42.11	74.75	94	-19.25
8-DPSK	Ch0	2402	PK	V	32.59	69.23	101.82	114	-12.18
	Ch0	2402	AV	V	32.59	36.33	68.92	94	-25.08
	Ch0	2402	PK	H	32.59	67.45	100.04	114	-13.96
	Ch0	2402	AV	H	32.59	36.70	69.29	94	-24.71
	Ch39	2441	PK	V	32.63	67.16	99.79	114	-14.21
	Ch39	2441	AV	V	32.63	33.47	66.10	94	-27.90
	Ch39	2441	PK	H	32.63	66.48	99.11	114	-14.89
	Ch39	2441	AV	H	32.63	31.40	64.03	94	-29.97
	Ch78	2480	PK	V	32.64	66.42	99.06	114	-14.94
	Ch78	2480	AV	V	32.64	33.36	66.00	94	-28.00
	Ch78	2480	PK	H	32.64	65.87	98.51	114	-15.49
	Ch78	2480	AV	H	32.64	33.05	65.69	94	-28.31

Remark:

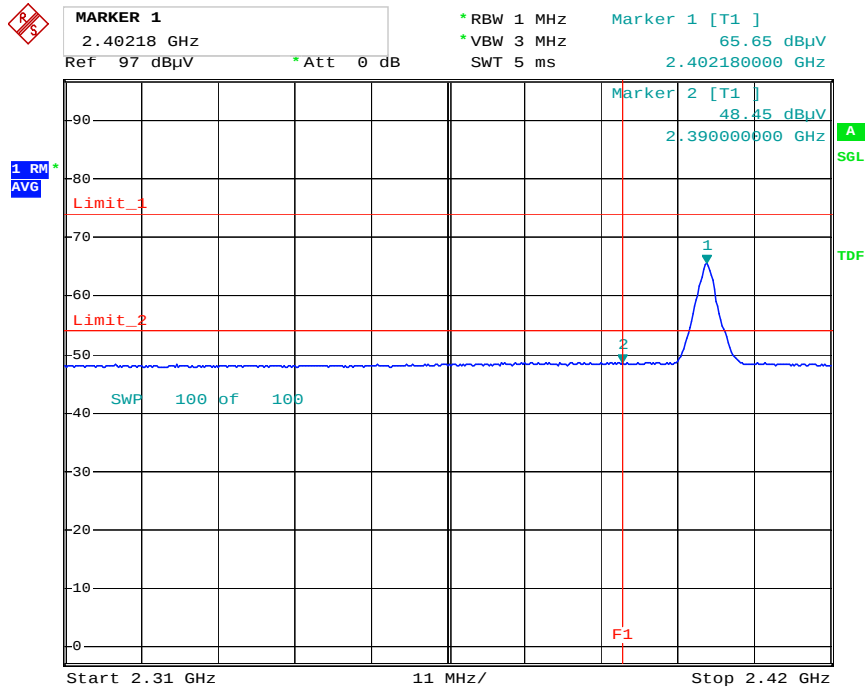
1. Correction Factor = Antenna Factor + Cable Loss
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3. The frequency measured ranges from 1 GHz to 25 GHz. The data value listed above which is higher than the system noise floor.

4. Radiated emission on the band edge FCC 15.249(d)

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental (2402~2480MHz) or to the general radiated emission limits in §15.209, whichever is the lesser attenuation.

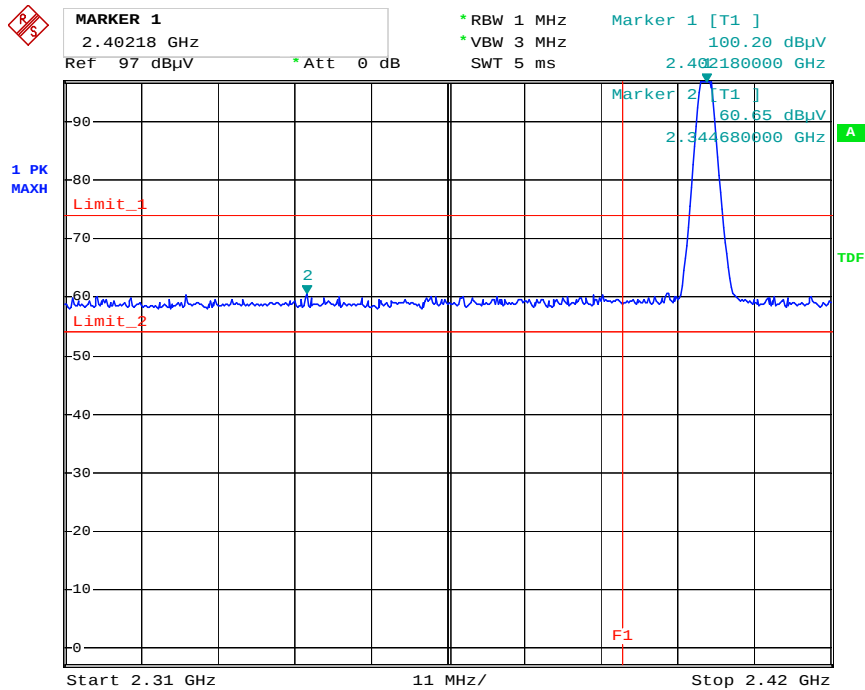
Mode	Frequency (MHz)	Spectrum Analyzer Detector	Ant. Pol. (H/V)	Correction Factor (dB/m)	Reading (dBμV)	Corrected Reading (dBμV/m)	Limit @ 3 m (dBμV/m)	Margin (dB)	Restricted band (MHz)
GFSK	2334.68	PK	V	32.31	28.34	60.65	74	-13.35	2310~2390
	2390.00	AV	V	32.51	15.94	48.45	54	-5.55	
	2483.50	PK	V	32.84	31.30	64.14	74	-9.86	2483.5~2500
	2483.50	AV	V	32.84	18.38	51.22	54	-2.78	
$\pi/4$ -DQPSK	2390.00	PK	V	32.51	25.45	57.96	74	-16.04	2310~2390
	2390.00	AV	V	32.51	15.82	48.33	54	-5.67	
	2483.50	PK	V	32.84	26.42	59.26	74	-14.74	2483.5~2500
	2483.50	AV	V	32.84	17.54	50.38	54	-3.62	
8-DPSK	2390.00	PK	V	32.51	26.75	59.26	74	-14.74	2310~2390
	2390.00	AV	V	32.51	15.87	48.38	54	-5.62	
	2483.50	PK	V	32.84	27.12	59.96	74	-14.04	2483.5~2500
	2483.50	AV	V	32.84	16.04	48.88	54	-5.12	

Band edge @ GFSK mode Channel_0 2402MHz Vertical AV



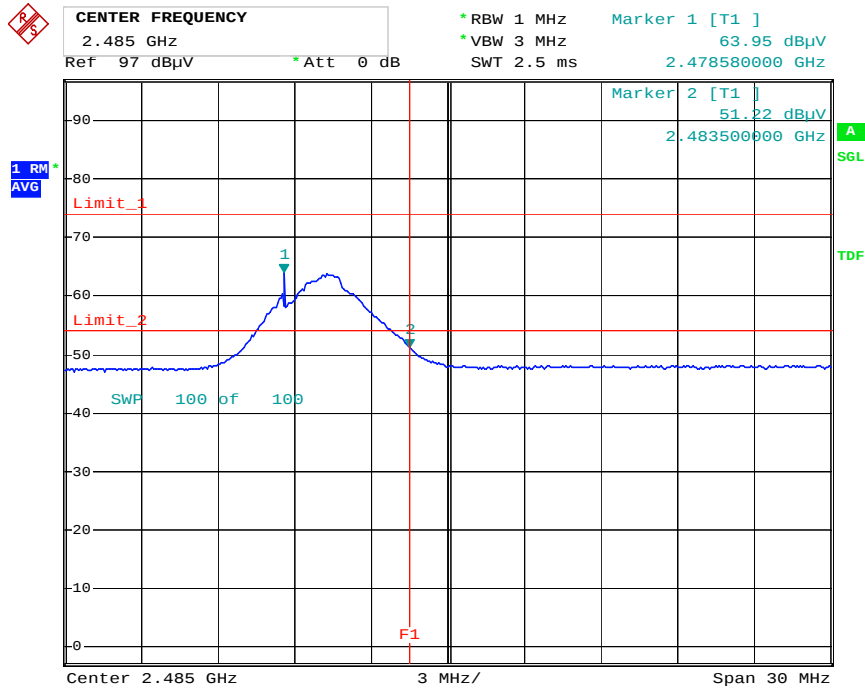
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Band edge @ GFSK mode Channel_0 2402MHz Vertical PK



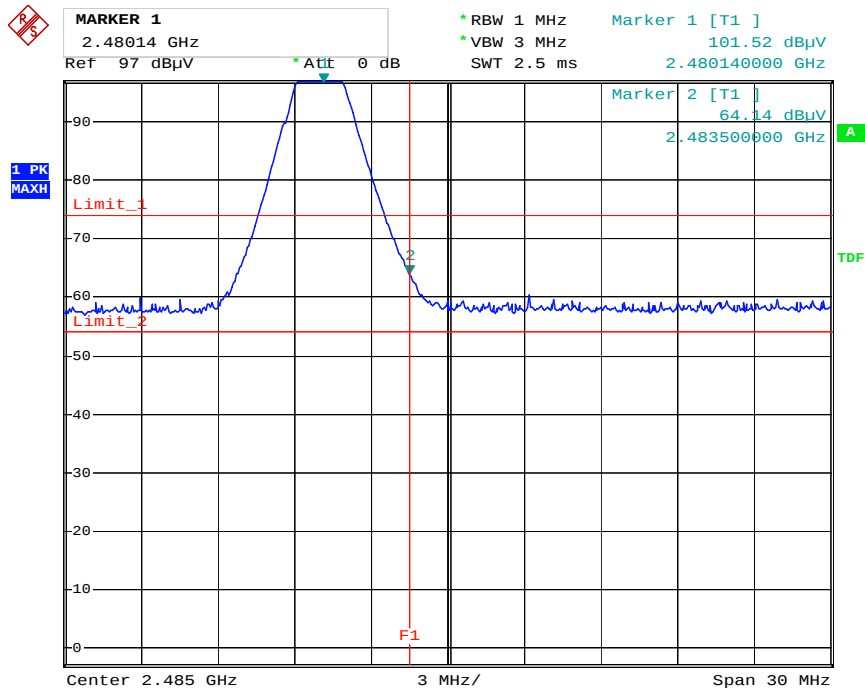
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Band edge @ GFSK mode Channel_78 2480MHz Vertical AV



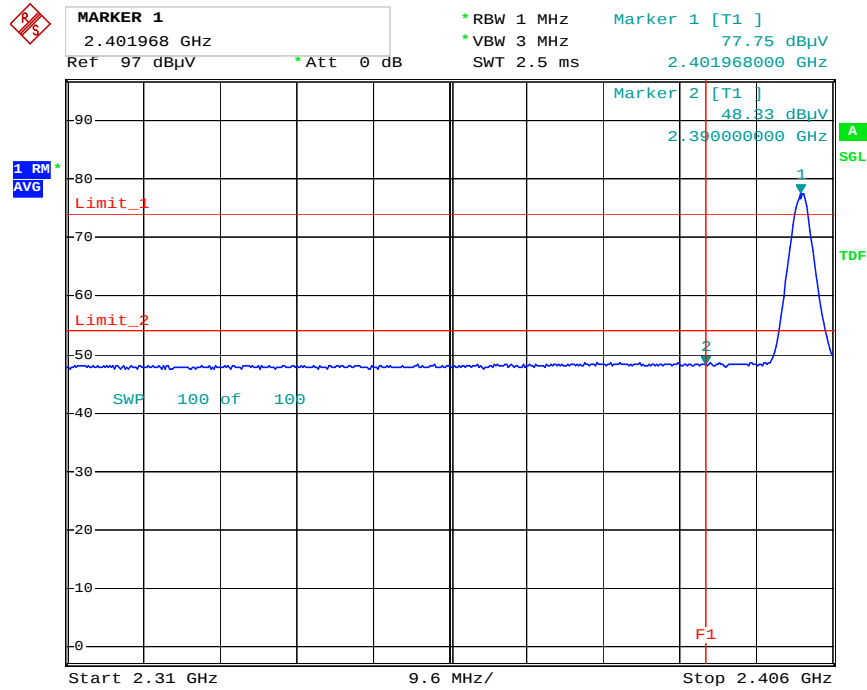
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Band edge @ GFSK mode Channel_78 2480MHz Vertical PK



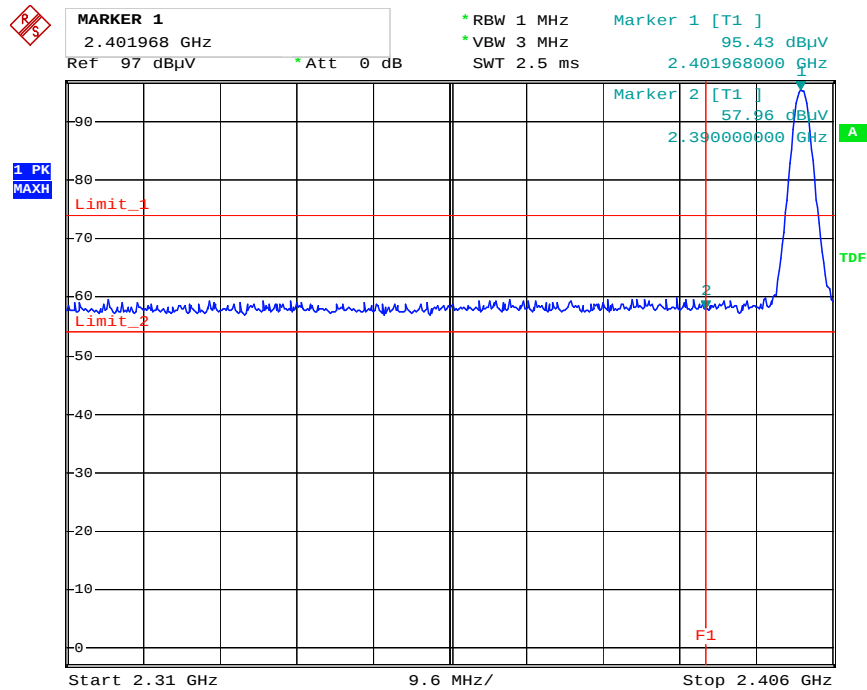
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Band edge @ $\pi/4$ -DQPSK mode Channel_0 2402MHz Vertical AV



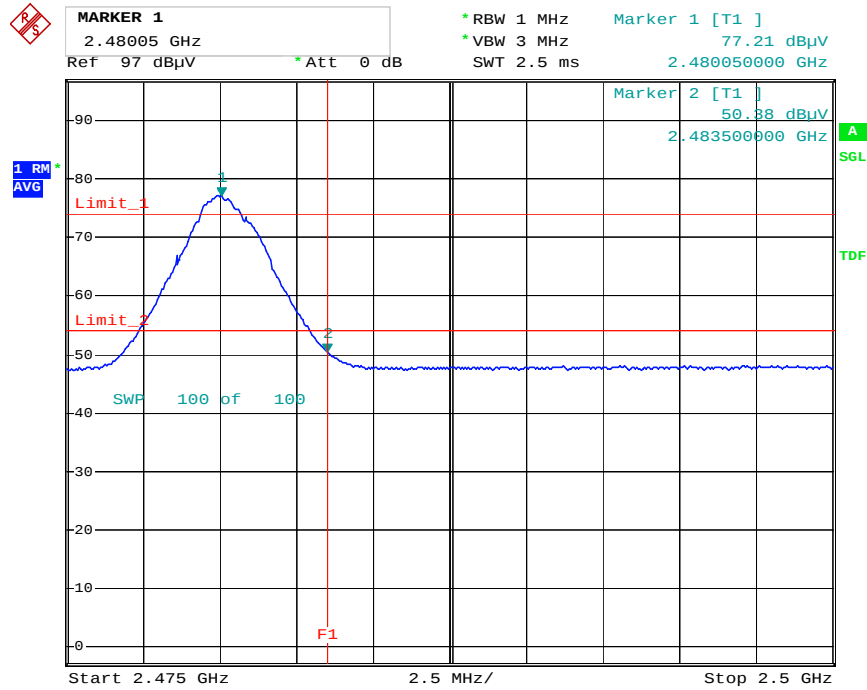
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Band edge @ $\pi/4$ -DQPSK mode Channel_0 2402MHz Vertical PK



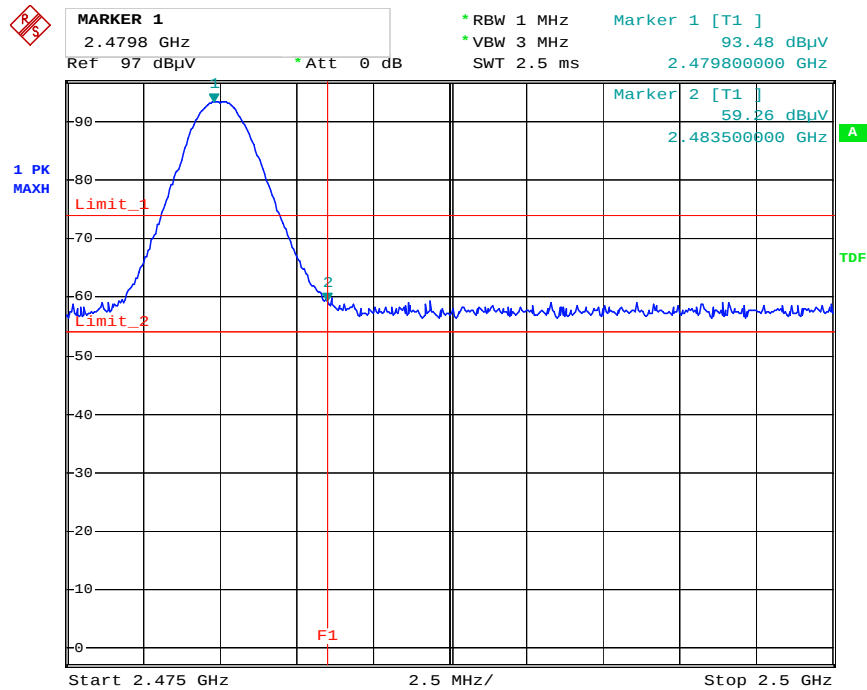
Date: 1.OCT.2015 18:45:28

Band edge @ $\pi/4$ -DQPSK mode Channel_78 2480MHz Vertical AV



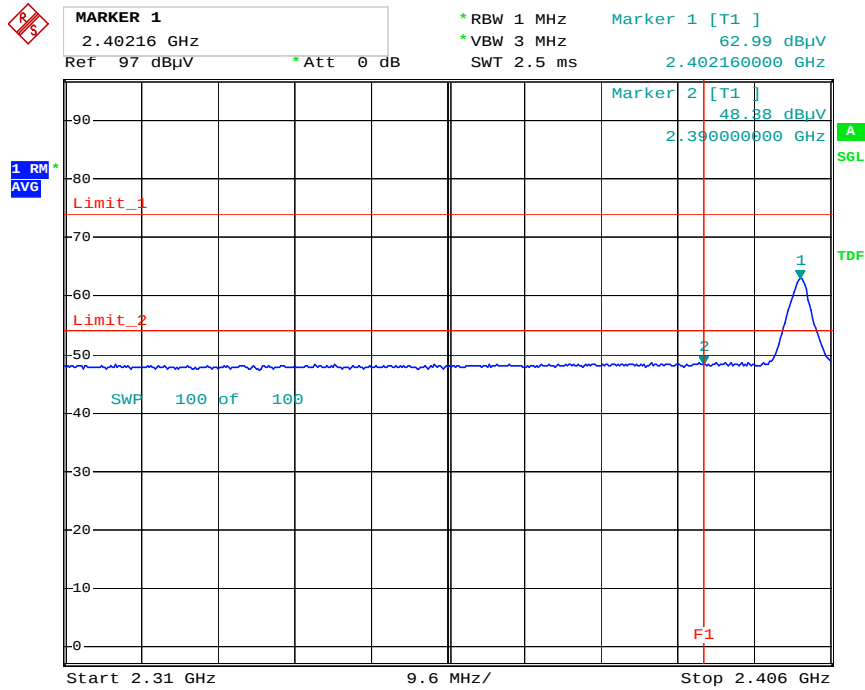
Date: 1.OCT.2015 18:53:09

Band edge @ $\pi/4$ -DQPSK mode Channel_78 2480MHz Vertical PK



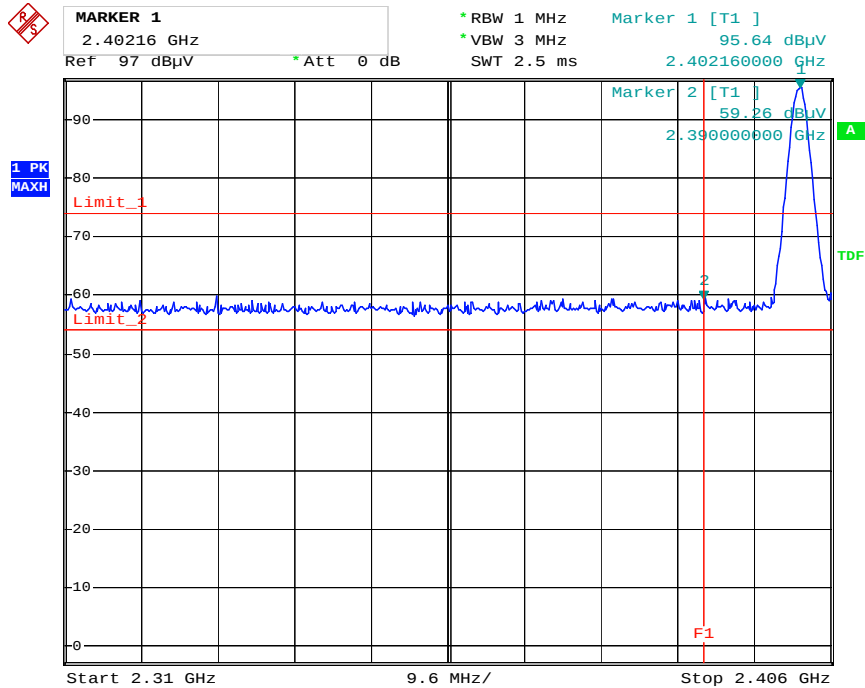
Date: 1.OCT.2015 18:52:33

Band edge @ 8-DPSK mode Channel_0 2402MHz Vertical AV



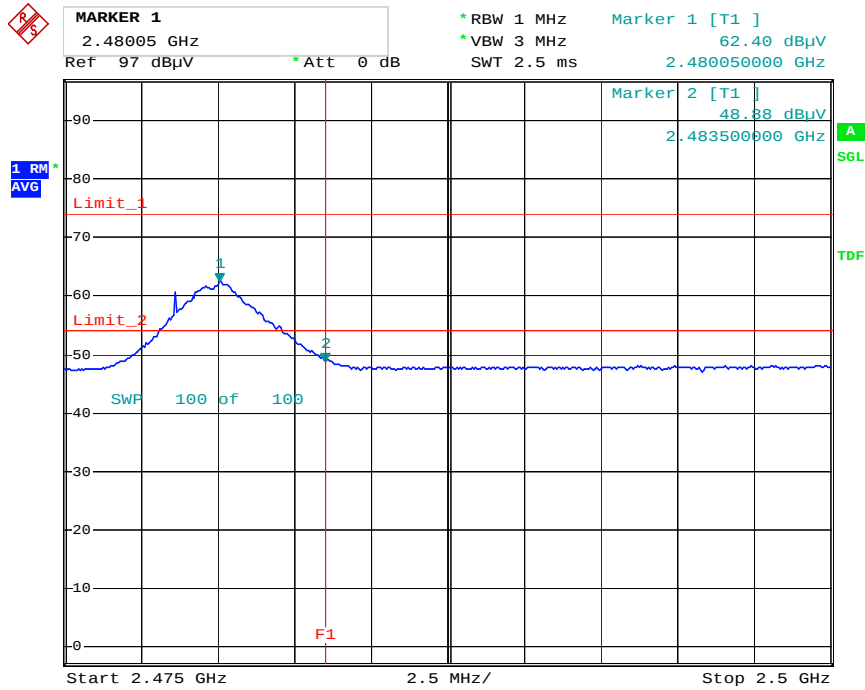
Date: 1.OCT.2015 18:48:23

Band edge @ 8-DPSK mode Channel_0 2402MHz Vertical PK



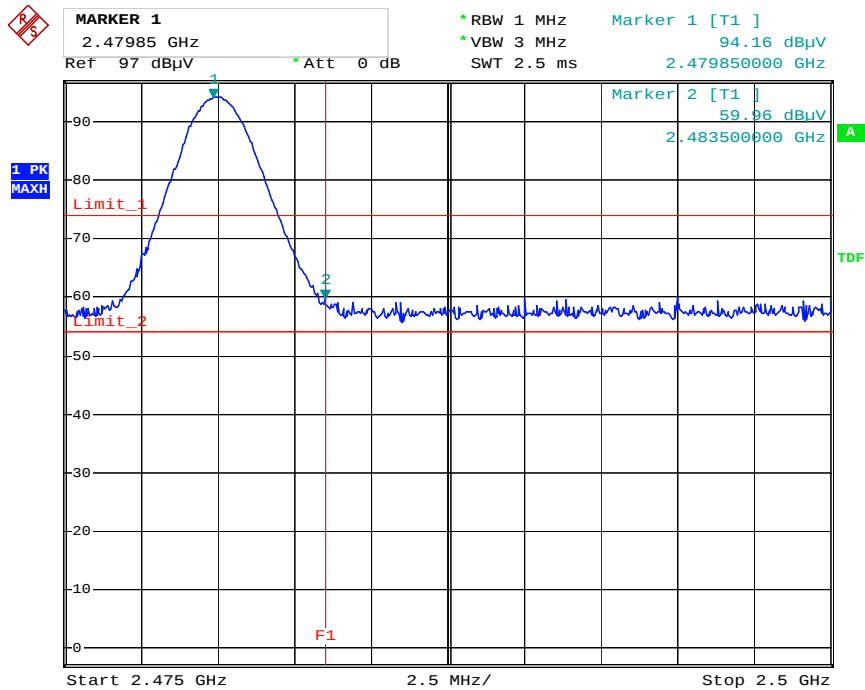
Date: 1.OCT.2015 18:49:23

Band edge @ 8-DPSK mode Channel_78 2480MHz Vertical AV



Date: 1.OCT.2015 18:57:09

Band edge @ 8-DPSK mode Channel_78 2480MHz Vertical PK



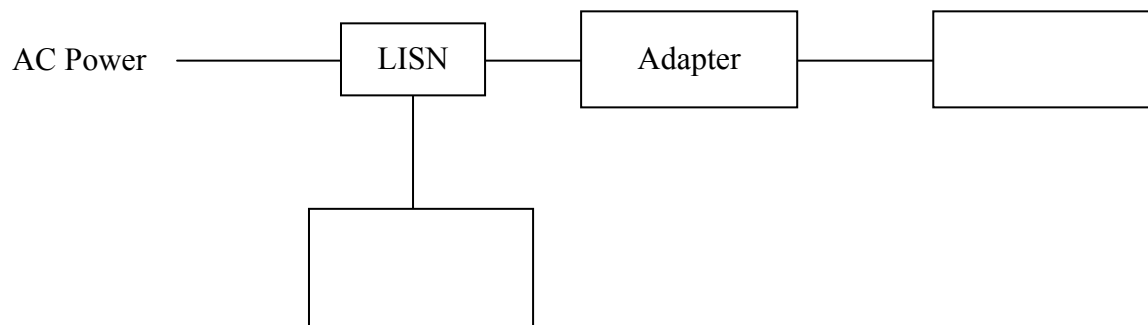
Date: 1.OCT.2015 18:56:30

5. Conducted emission test FCC 15.207

5.1 Operating environment

Temperature:	25	°C
Relative Humidity:	50	%
Atmospheric Pressure	1008	hPa

5.2 Test setup & procedure



The EUT are connected to the main power through a line impedance stabilization network (LISN). This provides a 50 ohm/50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination.

Both sides (Line and Neutral) of AC line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10:2013 on conducted measurement.

The bandwidth of the field strength meter (R & S Test Receiver ESCI 30) is set at 9kHz.

The EUT configurations please refer to the “Conducted set-up photo.pdf”.

5.3 Emission limit

Freq. (MHz)	Conducted Limit (dBuV)	
	Q.P.	Ave.
0.15~0.50	66 – 56*	56 – 46*
0.50~5.00	56	46
5.00~30.0	60	50

*Decreases with the logarithm of the frequency.

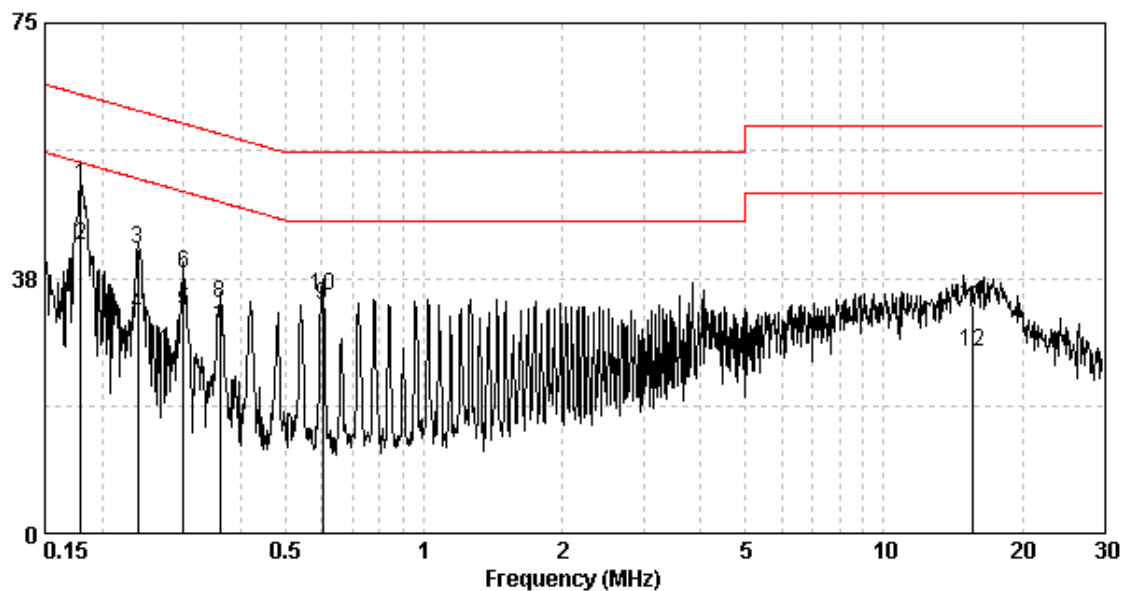
5.4 Conducted emission data FCC 15.207

Phase: Live Line
 Model No.: T-7XI-03-C
 Test Condition: Normal mode
 Test Voltage: 120 Vac, 60 Hz

Frequency (MHz)	Corr. Factor (dB)	Level Qp (dBuV)	Limit Qp (dBuV)	Level Av (dBuV)	Limit Av (dBuV)	Margin (dB) Qp	Av
0.180	9.74	51.09	64.50	42.20	54.50	-13.41	-12.31
0.239	9.74	41.75	62.13	32.12	52.13	-20.38	-20.01
0.300	9.73	38.21	60.24	32.72	50.24	-22.02	-17.52
0.360	9.73	33.81	58.74	29.96	48.74	-24.93	-18.77
0.601	9.76	34.91	56.00	33.65	46.00	-21.09	-12.35
15.600	9.88	33.57	60.00	26.70	50.00	-26.43	-23.30

Remark:

1. Correction Factor (dB) = LISN Factor (dB) + Cable Loss (dB)
2. Margin (dB) = Level (dBuV) – Limit (dBuV)

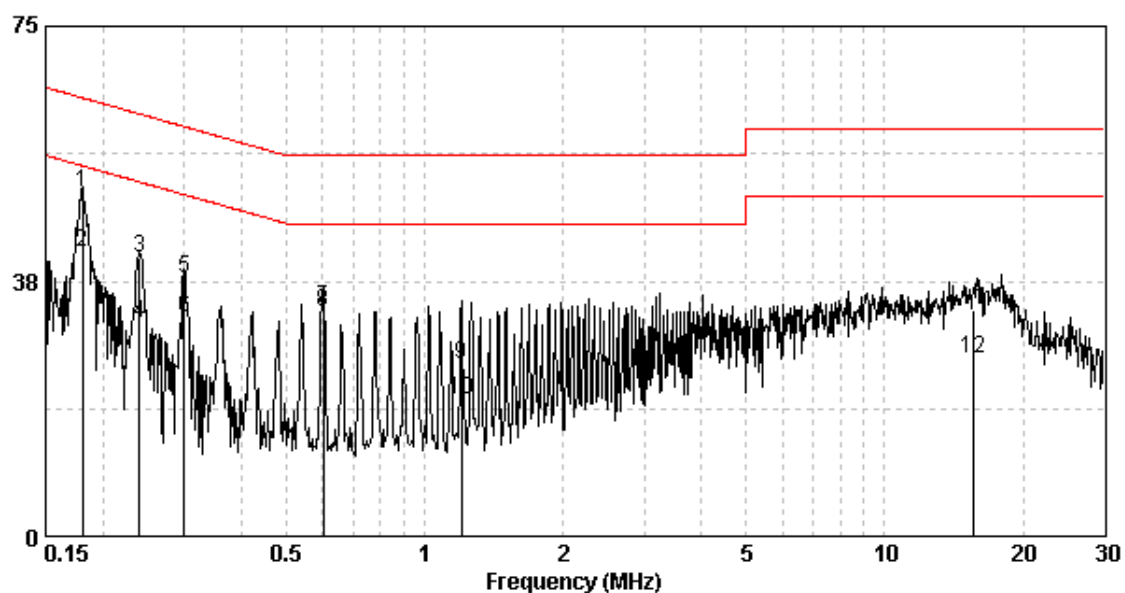


Phase: Neutral Line
Model No.: T-7XI-03-C
Test Condition: Normal mode
Test Voltage: 120 Vac, 60 Hz

Frequency (MHz)	Corr. Factor (dB)	Level Qp (dBuV)	Limit Qp (dBuV)	Level Av (dBuV)	Limit Av (dBuV)	Margin (dB) Qp	Av
0.181	9.74	50.45	64.46	41.72	54.46	-14.01	-12.74
0.240	9.74	40.91	62.08	31.40	52.08	-21.18	-20.69
0.300	9.73	37.98	60.24	32.13	50.24	-22.26	-18.10
0.601	9.76	33.59	56.00	33.05	46.00	-22.41	-12.95
1.203	9.84	25.32	56.00	20.01	46.00	-30.68	-25.99
15.600	9.96	33.14	60.00	26.22	50.00	-26.86	-23.78

Remark:

1. Correction Factor (dB) = LISN Factor (dB) + Cable Loss (dB)
2. Margin (dB) = Level (dBuV) – Limit (dBuV)



6. 20dB Bandwidth test

6.1 Operating environment

Temperature: 25 °C
Relative Humidity: 50 %
Atmospheric Pressure: 1008 hPa

6.2 Test setup & procedure

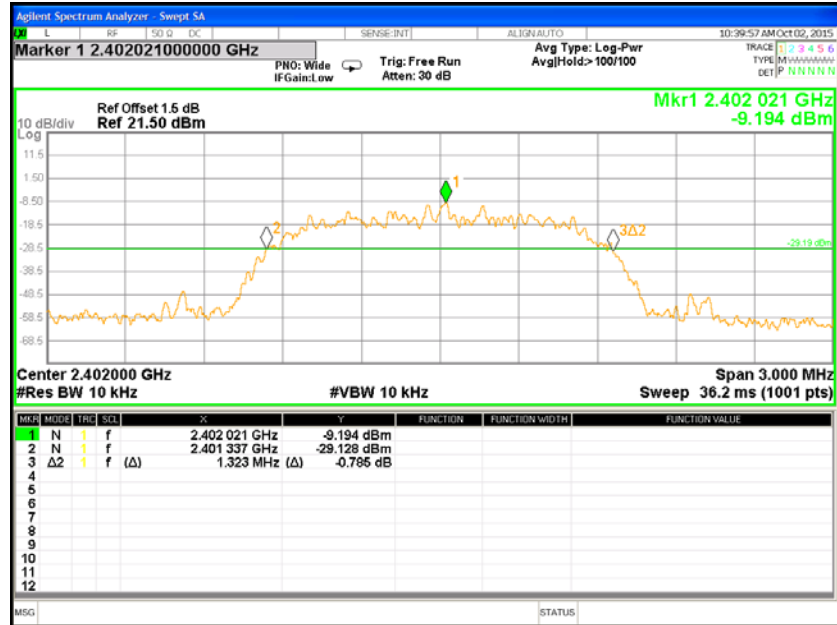
- Step 1: The 20dB bandwidth was measured using a 50 ohm spectrum analyzer
Step 2: The span range for the SA display shall be between two times and five times the OBW.
Step 3: The nominal IF filter bandwidth (3 dB RBW) should be approximately 1 % to 5 % of the OBW, unless otherwise specified, depending on the applicable requirement.
Step 4: The test was performed at 3 channels (lowest, middle and highest channel). The maximum 20dB modulation bandwidth is in the following Table.

6.3 Measured data of modulated bandwidth test results

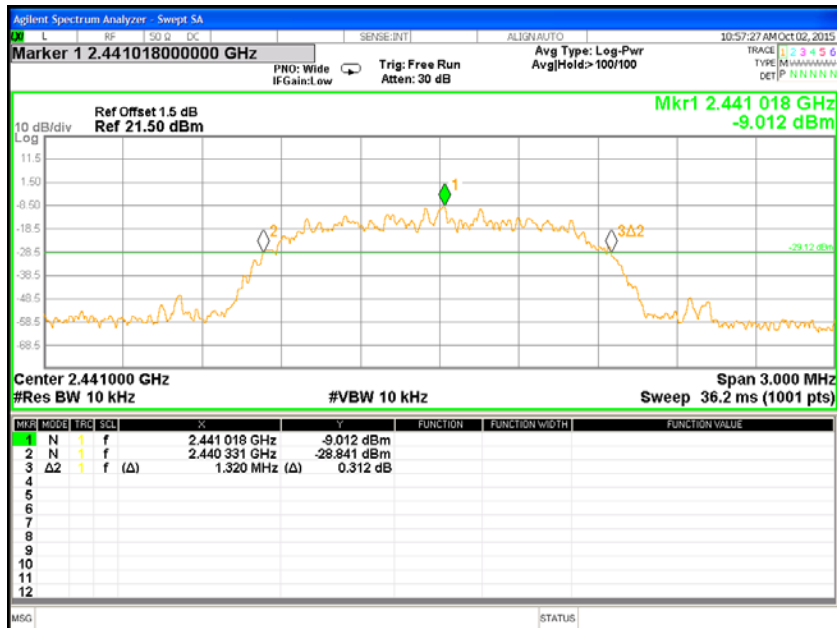
Modulation	Channel	Frequency (MHz)	Data Rate Mbps	20dB Bandwidth(MHz)
GFSK	0	2402	1	1.281
	39	2441		1.275
	78	2480		1.278
$\pi/4$ -DQPSK	0	2402	2	1.323
	39	2441		1.320
	78	2480		1.320
8-DPSK	0	2402	3	1.302
	39	2441		1.302
	78	2480		1.299

Please see the plots from Page 28 through Page 32.

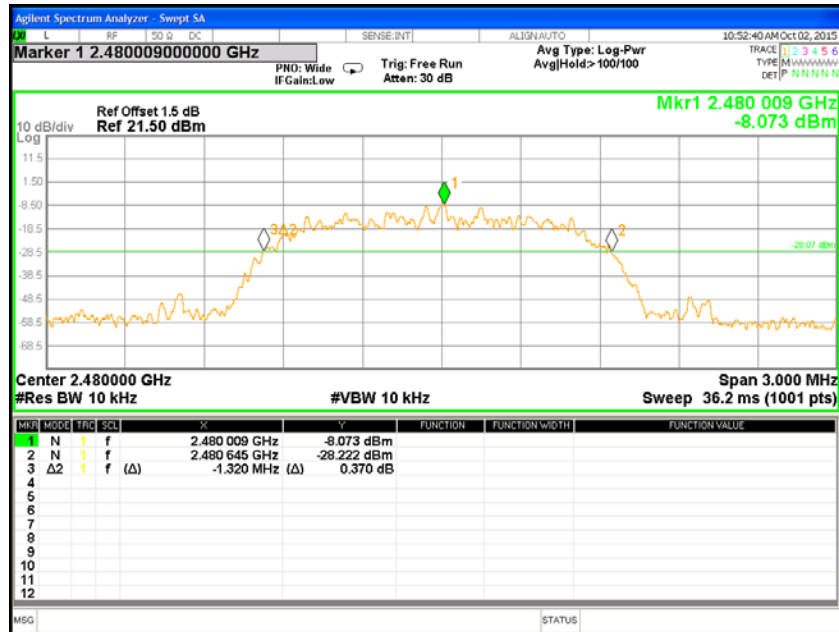
20dB Occupied Bandwidth @ $\pi/4$ -DQPSK mode Channel 0 2402MHz



20dB Occupied Bandwidth @ $\pi/4$ -DQPSK mode Channel 39 2441MHz



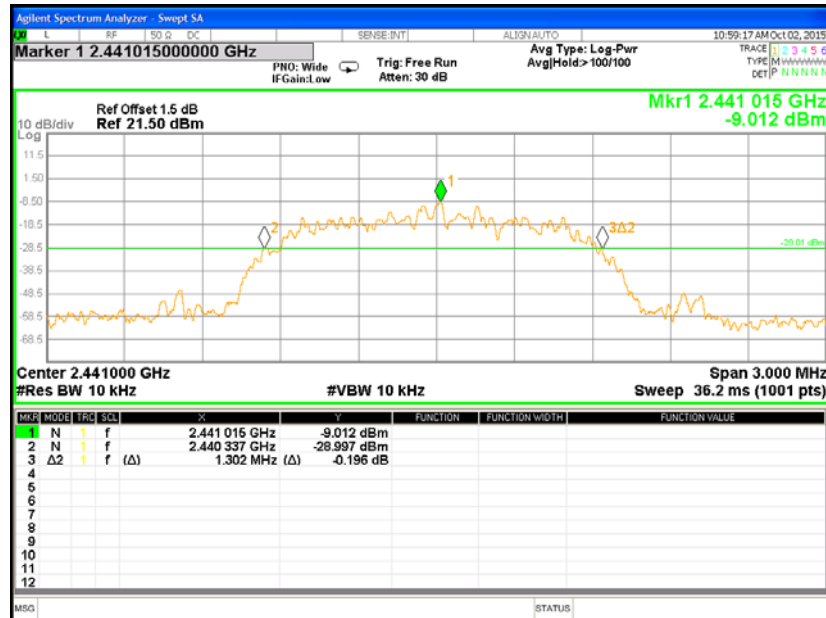
20dB Occupied Bandwidth @ $\pi/4$ -DQPSK mode Channel 78 2480MHz



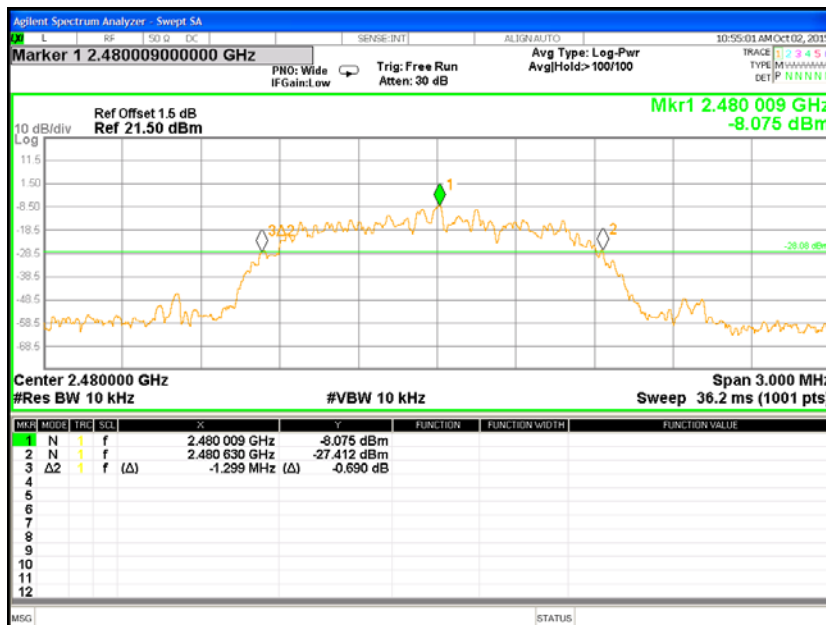
20dB Occupied Bandwidth @ 8DPSK mode Channel 0 2402MHz



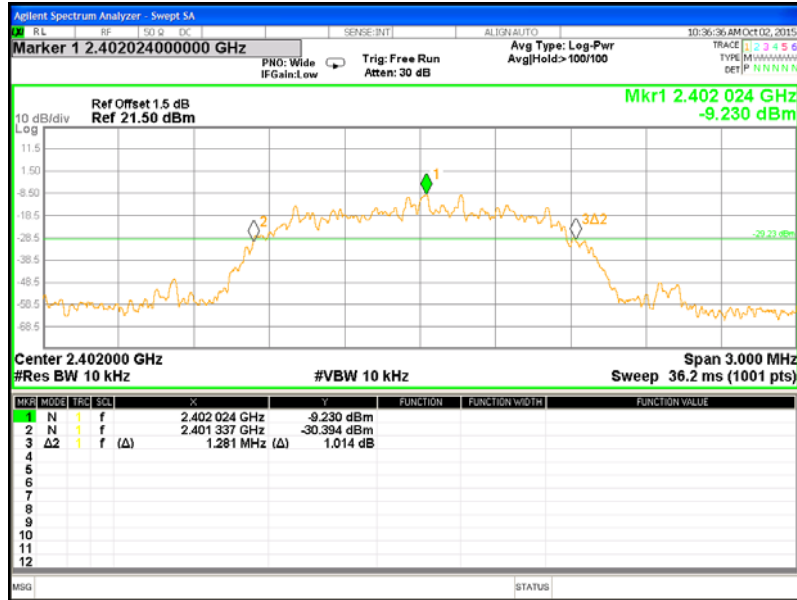
20dB Occupied Bandwidth @ 8DPSK mode Channel 39 2441MHz



20dB Occupied Bandwidth @ 8DPSK mode Channel 78 2480MHz



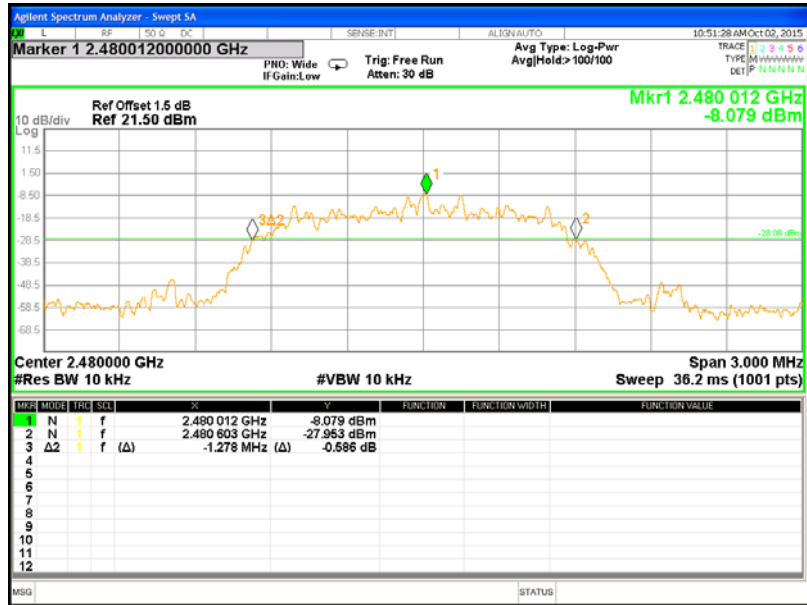
20dB Occupied Bandwidth @ GFSK mode Channel 0 2402MHz



20dB Occupied Bandwidth @ GFSK mode Channel 39 2441MHz



20dB Occupied Bandwidth @ GFSK mode Channel 78 2480MHz



Appendix A: Test equipment list

Equipment	Brand	Model No.	Serial No.	Calibration Date	Next Calibration Date
ESCI EMI Test Receiver	Rohde & Schwarz	ESCI	100018	2014/12/02	2015/12/01
Spectrum Analyzer	Rohde & Schwarz	FSP30	100137	2015/08/18	2016/08/16
Horn Antenna (1-18G)	Schwarzbeck	BBHA 9120 D	9120D-456	2014/08/29	2017/08/27
Horn Antenna (14-42G)	SHWARZBECK	BBHA 9170	BBHA9170159	2014/09/16	2017/09/14
Broadband Antenna	Schwarzbeck	VULB 9168	9168-172	2013/08/08	2016/08/06
Pre-Amplifier	MITEQ	JS4-26004000--27-8A	828825	2014/09/15	2015/09/14
Pre-Amplifier	MITEQ	JS4-26004000--27-8A	828825	2015/09/15	2016/09/13
Power Meter	Anritsu	ML2495A	0844001	2014/11/12	2015/11/11
Power Sensor	Anritsu	MA2411B	0738452	2014/11/12	2015/11/11
Two-Line V-Network	Rohde & Schwarz	ESH3-Z5	838979/014	2014/10/05	2015/10/04
Signal Analyzer	Agilent	N9030A	MY51380492	2014/09/19	2015/09/18
Signal Analyzer	Agilent	N9030A	MY51380492	2015/09/21	2016/09/19
966-2(A) Cable	SUHNER	SMA / EX 100	N/A	2015/05/06	2016/05/04
966-2(B) Cable	JUNFLON	SMA / J12J100880-00	AUG-26-08-002	2015/05/09	2016/05/07
RF Cable	SUHNER	SUCOFLEX 102	CB0006	2015/05/06	2016/05/04
Active Loop Antenna	SCHWARZBECK MESS-ELEKTRONIK	FMZB1519	1519-067	2015/4/30	2016/4/28
EMI Test Receiver	Rohde & Schwarz	ESR-7	101232	2014/12/1	2015/11/30
CON-1 Cable	SUHNER	BNC / RG-58	1521946	2015/05/09	2016/05/07
RF Cable	SUHNER	SUCOFLEX 102	SN 22068/2	2015/05/06	2016/05/04
High Pass Filter (3~18G)	Wainwright	WHKX3.0/18G-12SS	N/A	2015/06/06	2016/06/04
Pre-Amplifier(1-26.5G)	EMC Co.	EMC12635SE	980205	2015/10/07	2016/10/05
966-2_3m Semi-Anechoic Chamber	966_2	CEM-966_2	N/A	2015/02/24	2016/02/23
Brand		Software		Version	
ADT		Radiated test system		7.5.14	
Audix		e3		4.2004-1-12k	

Appendix B: Measurement Uncertainty

This uncertainty represents an expanded uncertainty expressed at approximately the 95 % confidence level using a coverage factor of $k=2$.

Item	Uncertainty
Vertically polarized radiated disturbances from 30MHz~1GHz in a semi-anechoic chamber at a distance of 3m	5.15 dB
Horizontally polarized radiated disturbances from 30MHz~1GHz in a semi-anechoic chamber at a distance of 3m	5.23 dB
Vertically polarized Radiated disturbances from 1GHz~18GHz in a semi-anechoic chamber at a distance of 3m	4.19 dB
Horizontally polarized Radiated disturbances from 1GHz~18GHz in a semi-anechoic chamber at a distance of 3m	4.3 dB
Vertically polarized Radiated disturbances from 18GHz~40GHz in a semi-anechoic chamber at a distance of 3m	4.19 dB
Horizontally polarized Radiated disturbances from 18GHz~40GHz in a semi-anechoic chamber at a distance of 3m	4.3 dB
Conducted Output power	0.86 dB
Radiated electromagnetic disturbances in the frequency range from 9kHz to 30MHz	2.92 dB
Conducted disturbance measurements at a mains port from 9 kHz to 30 MHz using a 50 Ω /50 μ H +5 Ω artificial mains network (AMN)	2.5 dB